15-160

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

No. ~~330.~~ 84

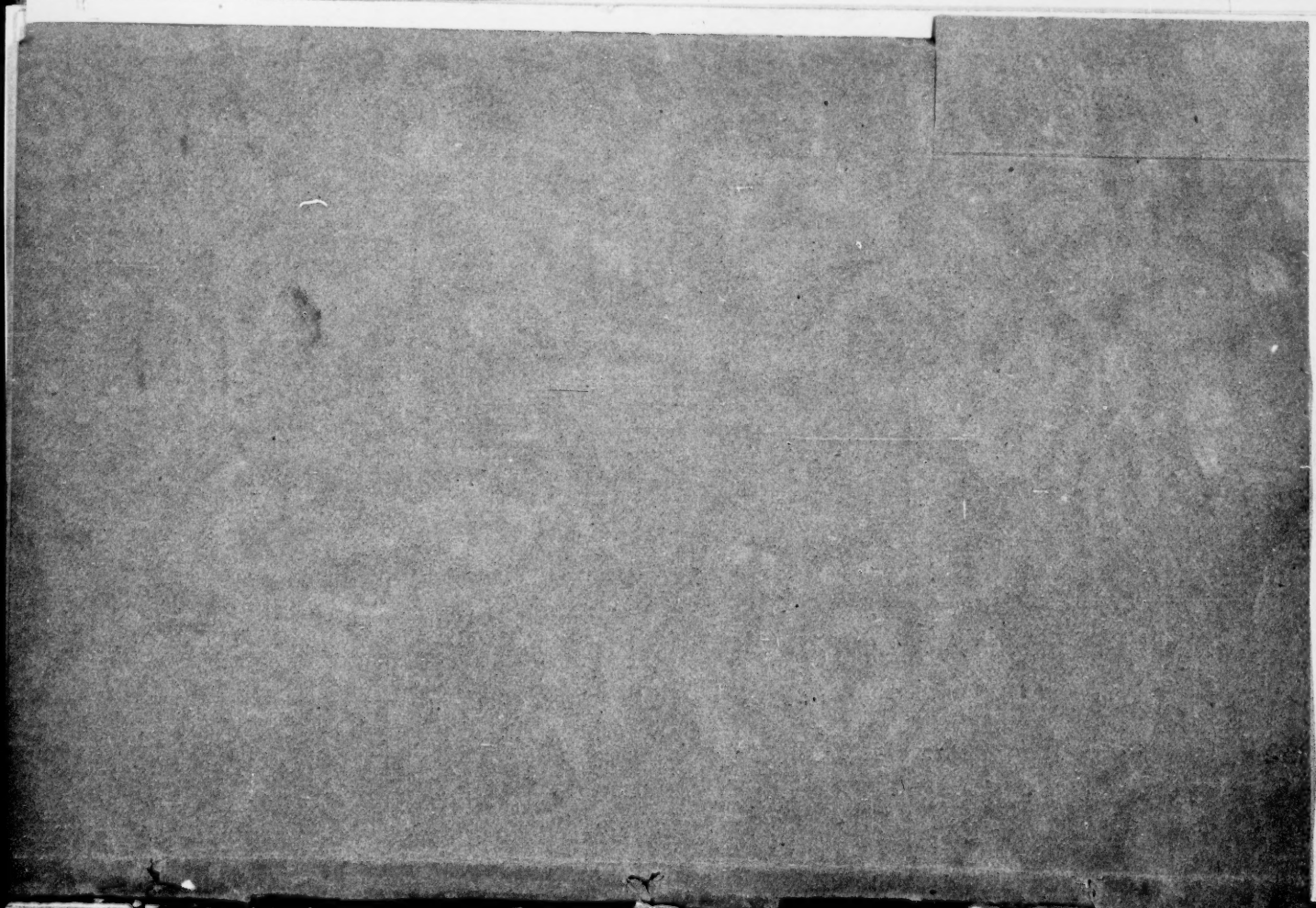
GIDEON BANTZ, APPELLANT,

vs.

DAVID FRANTZ ET AL.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF KENTUCKY.

FILED NOVEMBER 9, 1878.



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1 **Proceedings of the circuit court of the United States for the district of Kentucky, at a regular term begun and held at the Federal court hall, in the city of Covington, on Monday, May 13th, 1878, and of our Independence the 102d year.**

Present, Hon. Bland Ballard, judge of the United States for the district of Kentucky.

Be it remembered that heretofore, to wit, on May 4th, A. D. 1876, came the complainant, by his solicitors, Messrs. Hatch & Parkinson, and filed in the clerk's office of our said court his bill of complaint, which said bill of complaint is in the words and figures following, to wit:

Bill.

Circuit court of the United States for the district of Kentucky. In equity.

GIDEON BANTZ
vs.
DAVID FRANTZ, DAVID FRANTZ, JR., GEO. W. Frantz, and D. Frantz & Sons.

To the honorable the judges of the circuit court of the United States for the district of Kentucky.

Gideon Bantz, a citizen of the State of Maryland, and residing at Frederick City, in said State, brings this his bill of complaint against David Frantz, David Frantz, jr., and Geo. W. Frantz, partners, doing business in Louisville, in the State of Kentucky, and residents of said Louisville, State of Kentucky, and citizens of the said State of Kentucky, and of the United States, and thereupon your orator complains and says:

That heretofore, and before the 22d day of June, A. D. 1858, your orator was the original and first inventor of an improvement in boiler furnaces for burning wet fuel, fully described in the letters patent hereinafter mentioned, and which had not been known or used before his said invention, and which was not at the time of his application for a patent, as hereinafter mentioned, in public use or on sale with his consent or allowance.

And your orator, on information and belief, further shows unto your honors, that he being so as aforesaid the first inventor and discoverer of said improvement, and being also a citizen of the United States, did, on June 22d, 1858, upon due application therefor, obtain letters
2 patent of the United States for said invention, in due form of law, under the seal of the Patent Office of the United States, signed by the Secretary of the Interior, and countersigned by the Commissioner of Patents of the United States, bearing date the day and year last aforesaid, whereby there was granted and secured to him, the said Gideon Bantz, his heirs, administrators, or assigns, or intended so to be, for the term of fourteen years from and after the date of said letters patent, the full and exclusive right and liberty of making, constructing, using and vending to others to be used, the said invention and improvement, as set forth in said letters patent, which are now of record in the Patent Office of the United States, and by virtue whereof your orator became and now is the sole owner of all the rights and

privileges granted and secured, or intended to be granted and secured, in and by said letters-patent.

And your orator further shows unto your honors, that he having for good and lawful cause surrendered said letters patent to the Commissioner of Patents, and having made due application therefor, and having in all things complied with the acts of Congress in such case made and provided, did, on the 6th day of February, 1872, obtain new letters patent, being for the same invention, for the residue of said term, and which were marked Reissue No. 4731, and were issued in due form of law, under the seal of the Patent Office of the United States, signed by the Secretary of the Interior and countersigned by the Commissioner of Patents, and bearing date the day and year aforesaid, as by the said last mentioned letters patent, or a certified copy of the same, now in court ready to be produced, or by the copy of the same attached to this bill and marked Schedule A, will more fully and at large appear.

And your orator further shows unto your honors, that on or about 20th day of March, 1872, he made application for the extension of the term of said last mentioned reissued letters patent, No. 4731, for seven years from and after June 22d, 1872, and after full examination by the Commissioner of Patents, the extension was granted, and said letters patent were, by the certificate of said Commissioner, declared to have the same effect as if originally granted for twenty-one years.

And your orator further shows unto your honors, that by virtue of the premises he became, and now is, the sole and exclusive owner of said reissued and extended letters patent No. 4731, and the inventions and improvements described therein, and of all the rights and privileges granted and secured, or intended to be granted and secured, thereby. And that since he became the owner thereof as aforesaid, he has invested and expended large sums of money, and has been to great trouble in and about said invention, and for the purpose of carrying on the business of making and vending said improvement in boiler furnaces for burning wet fuel, and making the same profitable to himself and useful to the public; and that the said invention has been and is of great benefit and advantage; and that many persons have been licensed by your orator to use said improvements, to the great advantage of the public; and that the public have generally acknowledged and acquiesced in the aforesaid rights of your orator; and your orator believes that he will realize and receive large gains and profits therefrom, if infringement by said defendants and their confederates shall be prevented.

And your orator further shows unto your honors, that after the extension aforesaid, to wit, about November 22d, 1872, he filed a bill in equity in the circuit court of the United States for the southern district of Ohio, against Jacob Elsas and Samuel Pritz, of Cincinnati, Ohio; that the defendants in that case appeared by counsel, and filed an answer, alleging among other things, that the reissued letters patent were void because they were for a different invention from the original; because new matter was introduced therein; that the patented inventions were in public use for more than two years prior to the application for the letters patent; that the said invention had been invented and used by the following persons prior to the alleged invention of your orator, to wit:

J. C. Baum, at his chemical factory, then situated on Branch street, in the rear of No. 53 Dunlap street, in the city of Cincinnati, Ohio.

Michael Eckert, who resides at No. 88 Bank street, in the city of Cincinnati, Ohio, at his tannery, at No. 884 Central avenue, in said city of Cincinnati.

3 F. Bodman, of Cincinnati, Ohio, at his tannery, at No. 623 West Sixth street, in said city.

D. H. Taylor & Co., at their tannery, in said city of Cincinnati.

That a large mass of testimony was taken in said suit; that ample time was given to the defendants to make a full defense to said actions; that the defendants were assisted in their defense by a large number of tanners who were unlawfully using furnaces similar to those of defendants in said case; and that said tanners contributed to the payment of the expenses of said suit; that said case came on to final hearing on pleadings and proofs in June, 1874, before honorable Philip Swing, judge of said court, and was fully argued by counsel for both parties, and after full consideration, the court found that the said reissued letters patent, No. 4731, and the extension thereof, were good and valid; and that the defendants had infringed the same, and granted a perpetual injunction against the defendants, and directed an account of profits and damages to be taken, as, by a copy of the decree in said case hereto annexed, and marked Schedule B, will fully appear.

And your orator further shows unto your honors that upon the coming in of the master's report, which found that complainant in said case was entitled to recover from defendants the sum of $500, as the sum at which the complainant licenses parties to use each furnace constructed in accordance with his said patent, a final decree was entered for the complainant by the honorable Philip B. Swing, judge of said court, adjudging:

1st. That the reissued and extended letters patent, No. 4731, are good and valid in law.

2nd. That the defendants had infringed the same.

3rd. That the defendants pay to complainant the sum of $500, and also that the defendants pay the costs of the suit; which decree is here in court ready to be produced, and that said judgment has been satisfied, and no appeal taken.

And your orator further shows unto your honors, that the tanners in and around Cincinnati using furnaces for burning wet fuel, substantially such as that enjoined in the said suit, have acquiesced in said decree, and have paid license fees to your orator for the use of their said furnaces, among whom are the following: E. & D. Nepper, Lang & Wanner, G. R. Martin & Sons, Louis C. Bardes, J. F. Forbus & Co., Gottlieb Holder, D. H. Taylor & Co., J. & J. Grossmann, G. C. Spiegel, Scheu & Leist, H. Rasche & Son, H. Freiberg, A. Steigler & Co., Louis Ballauf, Meier & Lockwood, Michael Eckert, W. W. Snodgrass & Sons, Jacob Dewald, as have also the Dayton Leather & Collar Co., of Dayton, Ohio, and Curme, Dunn & Co., of Richmond, Ind.

Yet the said defendants, well knowing the premises, and the rights secured to your orator aforesaid, but contriving to injure your orator, and to deprive him of the benefits and advantages which might, and otherwise would, accrue unto him from said invention, after the issuing of the reissued letters patent No. 4731, as aforesaid, and before the commencement of this suit, did, as your orator is informed and believes, without the license or allowance, and against the will of your orator, and in violation of his rights and in infringement of the aforesaid reissued letters patent, extended as aforesaid, unlawfully and wrongfully, and in defiance of the rights of your orator, make, construct, and use the said invention, and did make, construct, and use boiler furnaces made according to, and employing and containing said invention, and that they still continue so to do; and that they are threatening to make the aforesaid boiler furnaces in large quantities and to use the same, and

that said manufacture and use of said boiler furnaces has been and is without the license or consent of your orator, and against his will, and in violation of his rights, and is an infringement of the aforesaid reissued letters patent No. 4731, so granted and extended as aforesaid, and that said unlawful acts and infringements have been committed by said defendant with a full knowledge of the rights of your orator, and in defiance of his rights.

And your orator further shows unto your honors that the furnaces so made and used as aforesaid, by the defendants herein, are substantially the same as those which were made and used by the defendants in the suit at Cincinnati, heretofore mentioned in this bill.

4 All in defiance of the rights acquired by and secured to your orator, as aforesaid, and to his great and irreparable loss and injury, and by which he has been, and still is being deprived of great gains and profits which he might, and otherwise would have obtained, but which have been received and enjoyed, and are being received and enjoyed by the said defendants, by and through their aforesaid unlawful acts and doings.

And your orator further shows unto your honors, on information and belief, that said defendants used said furnaces to a great extent, and are continuing to use the same extensively in business, and threatening to make more of the same. and have made and realized large profits and advantages therefrom; but to what extent, and how much exactly, your orator does not know, and prays a discovery thereof; and your orator says that the use of the said invention by said defendants, and their preparation for and avowed determination to continue the same, and their other aforesaid unlawful acts in disregard and in defiance of the rights of your orator, have the effect to and do encourage and induce others to venture to infringe said patent in disregard of your orator's rights.

And your orator further shows unto your honors, that he has caused notice to be given to said defendants of said infringements, and of the rights of your orator in the premises, and requested them to desist and refrain therefrom; but they have disregarded said notice, and refused to desist from said infringements, and still continue to make and use said boiler furnaces for burning wet fuel.

And forasmuch as your orator can have no adequate relief, except in this court; to the end, therefore, that the said defendants may, if they can, show why your orator should not have the relief hereby prayed, and may, according to their best and utmost knowledge, remembrance, information, and belief, full, true, direct, and perfect answers make to the premises, and to all the several matters hereinbefore stated and charged, as fully and particularly as if severally and separately interrogated as to each and every of said matters, and may be compelled to account for and pay to your orator the profits by them acquired, and three times the damages suffered by your orator from the aforesaid unlawful acts.

And your orator prays that said defendants, David Frantz, David Frantz, jr., Geo. W. Frantz, and D. Frantz & Sons, their servants, agents, attorneys, and workmen, and each and every of them, may be restrained and enjoined, provisionally and perpetually, by the order and injunction of this honorable court, from directly or indirectly making, constructing, using, vending, delivering, working, or putting into practice, operation, or use, or in anywise counterfeiting or imitating the said invention, or any part thereof, or any boiler furnace for burning wet fuel made in accordance therewith, or like or similar to those

which they have heretofore made; and that the said defendants may be decreed to pay the costs of this suit; and that your orator may have such further relief, or such other relief as to this honorable court shall seem meet, and as shall be agreeable to equity.

May it please your honors to grant unto your orator the writ of injunction, as well provisional as perpetual, issuing out of and under the seal of this honorable court, commanding, enjoining, and restraining the said defendants, David Frantz, David Frantz, jr., Geo. W. Frantz, and D. Frantz & Sons, their servants, agents, attorneys, and workmen, and each and every of them, as is hereinbefore in that behalf prayed.

May it please your honors to grant unto your orator the writ of sub pœna issuing out of and under the seal of this honorable court, directed to the said defendants, David Frantz, David Frantz, jr., Geo. W. Frantz, and D. Frantz & Sons, commanding them by a certain day, and under a certain penalty, to be and appear in this honorable court, then and there to answer the premises, and to stand to and abide such order and decree as may be made against them.

And your orator will ever pray, etc.

GIDEON BANTZ.

HATCH & PARKINSON,
Complainant's Solicitors.
HATCH & PARKINSON,
Counsel.

5 UNITED STATES OF AMERICA,
District of Maryland, ss:

On this 13th day of April, 1876, before me personally appeared Gideon Bantz, the above named complainant, who, being by me duly sworn, deposes and says that he has read the foregoing bill of complaint subscribed by him, and knows the contents thereof, and that the same is true of his own knowledge, except as to the matters therein stated on information and belief, and as to those matters he believes it to be true.

[SEAL.]

B. LYON RODGERS,
U. S. Commissioner for Maryland.

SCHEDULE A.

The United States of America to all to whom these letters patent shall come:

Whereas Gideon Bantz, of Frederick City, Maryland, has alleged that he has invented a new and useful improvement in furnaces for burning wet fuel (for which letters patent were issued to him June 22d, 1858, which said letters having been surrendered, the same have been cancelled, and new letters ordered to issue to him on an amended specification), and has made oath that he is a citizen of the United States; that he verily believes that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, praying that a patent may be issued therefor:

These are, therefore, to grant unto the said Gideon Bantz, his executors, administrators, or assigns, for the term of fourteen years from the twenty-second day of June, one thousand eight hundred and fifty-

eight, the full and exclusive right and liberty of making, using, and vending to others to be used, the said improvement, a description whereof is given in the annexed schedule and made a part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office to be hereunto affixed.

Given under my hand, at the city of Washington, this sixth day of February, in the year of our Lord one thousand eight hundred and seventy-two, and of the Independence of the United States of the ninety-sixth.

B. R. COWEN,
Acting Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.
[L. S.]
M. D. LEGGETT,
Commissioner of Patents.

4731.

UNITED STATES PATENT OFFICE.

Gideon Bantz, of Frederick, Maryland. Improvement in boiler furnaces for burning wet fuel.

Specifications forming part of letters patent No. 26616, dated June 22, 1858, reissue No. 4731, dated February 6, 1872.

To all whom it may concern:

Be it known that I, Gideon Bantz, of Frederick City, in the county of Frederick, in the State of Maryland, have invented a new and useful improvement in furnaces for burning wet fuel; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming a part of this specification, and in which—

Fig. 1 represents a longitudinal vertical section of a furnace embracing my invention, and showing its application to a steam-boiler.

6 Figure 2 represents a transverse vertical section through the fire-chamber in the plane indicated by the line *x x* of Fig. 1.

Figure 3 represents a transverse section through one of the reverberatory chambers in the plane indicated by the line *y y* of Fig. 1.

Similar letters of reference in each of the several figures indicate corresponding parts.

To enable others skilled in the art to make and use my invention, I proceed to describe its construction and operation.

A A are two arched fire-chambers, arranged side by side, furnished with grates *a a*, and having ash-pits B B provided below the said grates. These fire-chambers are not placed beneath the boiler H, but directly in front thereof, and longitudinally therewith. They may, however, be placed at one side of the boiler, and at an angle to it. Each is provided with the usual door *b*, but these are only used for lighting the fires; and the ash-pits are provided with doors *c* to regulate the supply of air through the grates, and permit the clearing out of ashes. In the top of each chamber there are openings *d d* for supplying the fuel to the furnaces. The fire-chambers are covered with a flat floor built over the arches that the fuel may be wheeled to the feeders in barrows, or brought in any other convenient manner. This floor and the fire-chamber arches are about eighteen inches thick from the crown of the fire-

chamber to the top surface, and on either side of the feeding openings *d* I form, between the arches and the floor, dead chambers d^2, which are fitted with ashes or other material, which will prevent the heat of the ashes from penetrating through the floor, and thus the latter is always kept cool for the engineer and workmen, which is a great advantage in this form of furnace.

The dimensions of the fire-chambers which I have found to produce the best results with wet tan, are, in height, three feet, four feet wide, and eight feet long; and the lids of the feeders should be set in the openings *d*, near the crown of the arch, so as to keep the heat in the chamber as much as possible.

The boiler is supported directly upon the rear wall of the furnace, and is outside of and elevated above the fire-chamber, so that the heat issuing therefrom is caused to impinge directly upon the boiler. This is practically the successful feature of the furnace, the results and benefits of which have not hitherto been attained, as the boiler not only receives the heat from the rear wall of the furnace, but the entire heat of the fire-chamber is concentrated directly upon it in a chamber where the combustion is intensified. The rear end of the boiler is supported upon the wall which forms the dividing flue E, and the heat from the reverberatory chamber is held by said wall close under the rear end of the boiler. At the rear end of each fire-chamber there is a throat-like aperature *e*, communicating directly with the reservoir C, which is built of brick, and lined with fire-brick directly under the front portion of the boiler, and which has a concave bottom *m*, and convex back *n*, which are constructed in a cima-reversa shape.

By having the bottom and back of the reservoir formed in this way, the throats *e* are not partially closed up, as they would be if the bottom was flat and set inclined. And besides this, the heated products of combustion are made to hug the bottom of the boiler, and as the draught is at this point, the perfect combustion of partially ignited gasses is effected. The convex back of the reservoir terminates in, and serves as a bridge-wall, and has a concave top, so formed as to leave a space *o* of but three or four inches between it and the boiler, as shown in Fig. 3 of the drawing. In the rear of the bridge-wall *f* there is a series of reverberatory chambers D D D, two, three, or more, one behind the other, the series extending nearly as far as the rear end of the boiler, and the said chambers being separated from each other by bridge-walls *g g*, and each chamber being provided with one or more doors *h*, in either or both sides, for the purpose of admitting air in small quantities to complete the combustion of the gasses from the fire-chambers, or a greater supply to check the draught.

7 The combustion-reservoir is furnished with a door or doors, *h'*, to admit air therein, directly in contact with the products of combustion from the fire-chambers, to increase their combustion at the point of the greatest heat beneath the boiler. At the rear of the hindmost reverberatory chamber there is a wall, *g*, like the bridge-wall *g g*, behind which there is a diving or drop-flue, E, leading to the chimney, and which communicates with the reverberatory chambers by means of a small opening in the wall *g'* directly beneath the rear end of the boiler. This arrangement of the diving-flue serves two highly important and advantageous purposes, viz: To cause the heat to hug the rear portion of the boiler, and to extinguish the sparks from the furnace; but the manner in which it effects the retention of the heat beneath the rear portion of the boiler causes the latter to be heated nearly uniformly throughout its entire length, a result which could not be attained if the

heat was allowed to pass off rapidly at the rear of the flue beneath the boiler, as heretofore. This diving-flue, E, is formed by means of two walls, g^1 and g^2, the latter serving the additional purpose of a support for the rear end of the boiler, and the wall g^1 constituting the rear side of the rear reverberatory chamber D, the chimney or smoke stack being formed outside of the rear wall of the diving-flue, and the two communicating some distance beneath the boiler, as shown in Fig. 1 of the drawing.

The operation of the furnace is as follows: Only the rear portion of the fire-chambers having been filled with wet fuel through the rear feeders *d*, a fire of dry fuel is kindled in their front portions, the doors of the fire-chambers are closed, and the doors of the ash-pits B partially opened for a draught. The fire from the dry fuel soon heats the fire-chambers, and also dries and ignites the tan. The hot ashes falling into the ash-pits heat the same, and soon the whole mass of wet fuel will become heated and a mass of smouldering fire. The fire-chambers being heated to a very high degree, the doors of the ash-pits are nearly closed, and the chambers filled with wet fuel, which piles up on the grates in a conical form, leaving but comparatively a thin layer all around the edges of the grate, so as to allow of a draught through the grate and to burn more readily.

The products of combustion pass from the fire chambers into the reservoir or chamber C in the rear, and under the front end of the boiler, and to extinguish the sparks from the furnace; but the manner in which it effects the retention of the heat beneath the rear portion of the boiler, where it comes into contact with a certain amount of atmospheric air, admitted through the doors *h'*, and produces the most intense heat in their union, effecting a more complete consumption of the products of combustion. This union takes place in the reservoir directly under the front of the boiler, and is, therefore, utilized at the point where it gives out its heat directly upon the same; and without this union of atmospheric air and gases at this point the largest amount of heat would be lost, because it could nowhere else be concentrated with such effect upon the boiler outside of the fire-chambers.

The products of this combustion pass over the bridge-walls into and through the several reverberatory chambers, in each of which a portion of their heat is absorbed by contact with the boiler, and finally they descend the flue E to the chimney. The effect of the principal portion of my invention, which consists in the arrangement and location of the reservoir C, with respect to the boiler and the fire-chambers, is, that the products of combustion and heat are caused to leave the fire-chambers through the throats *e e* in immediate and direct contact with the boiler, and the said chambers and reservoir are consequently caused to be heated to an intense degree, and to give out that intense heat upon the boiler without passing through an intermediate flue, while, at the same time, the boiler occupies no space within or above the fire-chambers. A very important feature in this furnace is the location of the combustion reservoir above the fire-chambers, as thereby the products of combustion are not forced out of a natural draught, but merely follow their natural tendency to rise in said reservoir.

8 The door or doors *h'* in the combustion-reservoir C serve to admit any desired quantity of atmospheric air to this reservoir or chamber, and the amount admitted may be, as is required by different circumstances, regulated by the opening or closing of said doors; and thereby affords not only a very convenient, but a very durable and cheap means of effecting this. At night, or any time when no steam is

required from the boiler, or when high heat is not required, the two front feeders should be filled up with fresh fuel, the ash-pit doors closed up, and one or more of the doors *h h* in the reverberatory chambers opened to stop the draught beneath the boiler, and the fire will smoulder and keep in such a degree of heat that on the doors *h h* being closed, and the ash-pit doors being opened, the fires will instantly burn bright, and the boiler heated by the furnaces may be at once ready for operation. The doors *h h* in the reverberatory chambers, besides being used to admit cool air in sufficient quantity to prevent draught and keep the fire damped, serve also to admit air in more limited quantities to effect the combustion in the reverberatory chambers of any inflam'able gasses that may pass the combustion chamber C.

I do not claim a furnace for burning wet fuel, broadly, nor the use of a series of fire-chambers connecting with the common flue, arranged between the furnace and the boiler, as I am well aware that this has been done before.

Having described my invention, I claim—

1. In a furnace for burning wet fuels, having two or more single fire-chambers not arranged under the boiler, the combustion-chamber or reservoir C, arranged above the top of said fire-chambers, and located directly under the front end of the boiler, essentially as described.

2. The cima-reversa bottom *m n* of the combustion-chamber or reservoir C, in combination with the narrow throats *e* of the separate fire-chambers, and the narrow exit flue *o* of the bridge-walls *f*, for the purpose essentially as described.

3. In combination with the combustion-chamber or reservoir C, arranged and located as described, I claim the side door or doors *h'*, for the admission of atmospheric air, for the purpose described.

4. In combination with a series of fire-chambers A, and the combustions-chamber or reservoir C, located and arranged directly beneath the front end of the boiler, and above the crown of said fire-chamber, I claim a series of reverberatory chambers, D, provided with side doors *h*, and a diving flue, E, at the rear end of the boiler to hold the heat beneath the same throughout its entire length, and to arrest and deaden the sparks as described.

5. In a furnace for burning wet fuels in which the fire-chambers are not arranged under the boiler, I claim the arrangement of the boiler upon the rear wall of the furnace and the rear wall of the diving-flue E, for the purpose of obtaining the full advantage of the heat of the walls of the furnace, and of the diving-flue, as described.

6. In a furnace for burning wet fuels, having a flat top, and supplied through openings therein, I claim the dead-chambers, arranged between the floor and the arches of the fire-chambers, for the purpose of maintaining the top of the furnace cool for the workingmen, as described.

GIDEON BANTZ.

Witnesses:

A. E. H. JOHNSON,

ALEX'R A. C. KLAUCKE.

9 **Gideon Bantz. Improvement in boiler furnaces for burning wet fuel.**

No. 4731. Reissued Feb. 6, 1872.

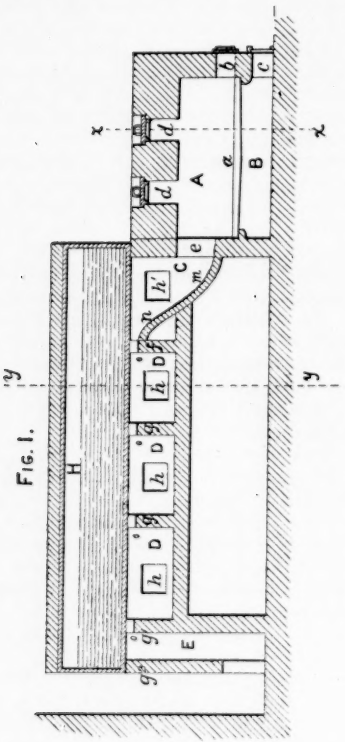


FIG. 1.

Inventor:

GIDEON BANTZ,
By JOHNSON, KLAUCKE & CO.,
His Attorneys.

Witnesses:
WM. J. PEYTON,
JOHN G. TRINE

10 Gideon Bantz. Improvement in boiler furnaces for burning wet fuel.

No. 4731. Reissued Feb. 6, 1872.

FIG. 2.

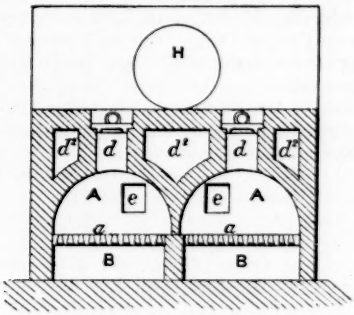
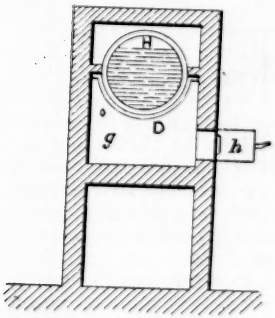


FIG. 3.



Inventor:

GIDEON BANTZ,
By JOHNSON, KLAUCKE & CO.,
His Attorneys.

Witnesses:
WM. J. PEYTON,
JOHN G. TRINE.

11 *Certificate of extension.*

Whereas, upon the petition of Gideon Bantz, of Frederick City, Maryland, for the extension of the patent granted to him June 22, 1858, and reissued February 6, 1872, for improvement in boiler furnaces for burning wet fuel, the undersigned, in accordance with the 18th section of the act of Congress; approved on the 4th day of July, 1836, entitled "An act to promote the progress of the useful arts, and to repeal all acts and parts of acts heretofore made for that purpose," and the act approved the 27th day of May, 1848, entitled "An act to provide addi-

of our said court to be hereunto affixed, at the clerk's office of said court, in Covington, this 4th day of May, A. D. 1876, and in the one hundredth year of our Independence.

Attest:
[SEAL.] H. BOSTWICK, *C. C. C. K. D.*

MEMORANDUM.—The said defendants are required to enter their appearance in the clerk's office of said court on or before the first Monday in June, 1876, otherwise the said bill will be taken pro confesso.

H. BOSTWICK, *Clerk.*

14 Upon which process the marshal made the following return, to wit:

Executed May 6th, 1876, by delivering a copy of the within spa. in chancery to each of the within-named, David Frantz, Geo. W. Frantz, and David Frantz, jr.

ELI H. MURRAY, *U. S. M.*,
By HENRY CRITTENDEN, *D. M.*

Afterwards, to wit, on July 3d, came the defendants, by J. N. Harlan, esq., one of their attorneys, and filed their joint answer herein, which said answer is in the words and figures following, to wit:

Answer.

In the circuit court of the United States for the district of Kentucky, (at Covington.) In equity.

GIDEON BANTZ
vs.
DAVID FRANTZ & SONS.

The joint answer of David Frantz, sr., Geo. W. Frantz, and David Frantz, jr., composing the firm of D. Frantz & Sons, to the bill of complaint exhibited against them by Gideon Bantz, in this court. Filed July 3rd, 1876.

These respondents, reserving to themselves all advantages from the many defects of the bill, for answer to the same, or to such parts thereof as they are advised they should make answer to, say:

It is not true, as in the bill alleged, that the complainant was the original and first inventor of the improvement claimed by him, or of any of those parts, features, or "claims" thereof, as are relied on by complainant in this suit, or as have any resemblance to the furnace used by these respondents, and which are said to be infringed herein. The only claim of this sort is the first claim, and this is fully anticipated by the patent granted by the United States to Moses Thompson, on the 10th day of April, 1855, No. 12678, for improvement in furnaces for burning wet fuel. And as far as complainant's invention consists in having a deep chamber, rather than the shallow flue as described and made by Moses Thompson, said A. M. Taylor & Co., or H. W. Taylor & Co., predecessors of these respondents in the tannery business at the present place, made and publicly used such a deep chamber as early as 1857, by digging out the earth in the flue of the patent furnace put up for them by Moses Thompson's agent. As to the use of side doors, it will be shown hereafter that they cannot be used for the

purpose stated in the patent; but for the purpose of taking out ashes,
they were in the public use long before complainant's pretended
15 invention, among others in the boiler furnace heated with coal
which was in use by the predecessors of these respondents at their tannery in Louisville, long before 1855, and in the Thompson furnace which they put up, as hereinafter stated.

A certified copy of the latter patent is filed herewith, marked Exhibit A A.

These respondents further say that the very furnace from the use of which they are sought to be enjoined herein was built for them lately, only in place of older ones worn out, from time to time; one of which Moses Thompson had built at their tannery in the city of Louisville (then belonging to the respondent David Frantz, sr., and one A. M. Taylor, partners, as A. M. Taylor & Co.), long before the grant or issual of the plaintiff's original patent.

These respondents admit the facts about the issual and surrender of complainant's original patent, and the issual of the new patent in lieu thereof as set forth in the bill, and they file herewith as Exhibit B B, a certified copy of the original patent to Gideon Bantz of June 22nd, 1858; but they insist that on the face of the papers the reissue is unlawful and void.

Further answering, these respondents deny that the patent is useful or profitable to complainant, otherwise than that he uses it unjustly and corruptly, to extort the price of licenses from many tanners who find such payment cheaper than the cost of defending unfounded suits. It is also denied that the patent is useful. On the contrary, furnaces really constructed on complainant's patent would be worthless—none is actually anywhere constructed in accordance with his specifications, not even by those who have paid him for a license.

These respondents admit the filing of a suit by the complainant against Elsas & Pritz, in the circuit court of the southern district of Ohio, and the proceedings therein, as in the bill of complaint set forth; but they object to the partial record exhibited with the bill being read or considered. And they deny that the defendants in that suit were assisted by other tanners in making their defense or in paying the expense thereof; but on the contrary, for the want of such assistance they neglected and abandoned the defense of the case, and its merits never came fully and fairly before the circuit court for the southern district of Ohio. For this reason of want of assistance, Elsas & Pritz spent only a small sum in the defense, wholly disproportionate to the work in such a case, and took no pains in the preparation of their defense. Although they set up the want of novelty of complainant's patent in their answer, they failed to give the name and residence of Jacob Magly, who had made, and of Herman Rasche, who had been using, a similar furnace in 1857; and the evidence to that effect was afterwards ruled out on that ground on complainant's demand. And though the reissue might be unlawful on the face of the claims in it and in the original patent, and though this point was raised by defendant's counsel in argument, the court could not pass upon it for want of an allegation to that effect in the answer. All this appears from the printed brief of complainant, filed in the cause. The counsel for defendant also failed to take proof on the question of infringement, but bound himself by admissions to the plaintiff's proof; though he could easily have proved that the furnace of Elsas & Pritz did not in any way infringe on claim 3 of complainant's reissue.

These respondents are informed and believe, and so state, that the decree in the cause of Gideon Bantz against Elsas & Pritz was really

agreed upon between the parties; and the defense, in fact, abandoned before the decisions of the court were delivered.

Further answering, these respondents deny that all of the firms of tanners named in the bill of complaint paid the complainant for licenses, but admitting that some of them did, they say that the complainant pressed his license upon others for nothing, merely to prevent any litigation in earnest, by which the validity or extent of his patent might be endangered. Those of the firms of tanners who did accept and pay for licenses did so under the advice of counsel, who told them that the complainant had no right or case against them, but that it would be cheaper for them to compromise with him in that way than to carry on even a successful litigation with him.

16 For all of which reasons these respondents insist that the decree in the case of Bantz vs. Elsas & Pritz, and the submission of some other tanners in Cincinnati and its neighborhood, should not be drawn into precedent against them, nor should it be deemed to strengthen the complainant's right to a provisional injunction.

They insist and aver that the patent sued upon is, both for want of novelty and usefulness, as shown in this answer, null and void.

They deny that they ever made, constructed, or used the complainants' pretended inventions, or thing described in his patents; or that they ever made, used, or constructed boiler furnaces made according to the same; and they deny that they threaten to make the aforesaid boiler furnaces in large quantities, or in any other quantities, or even to make any boiler furnaces of any kind. These respondents are tanners, not furnace builders, and, having one furnace already, do not stand in need of another.

They file with this answer correct drawings, plans, side elevations, and sections of their furnace and boiler, prepared by an expert architect and engineer, and, not knowing the details of the build of Elsas & Pritz's furnace, they neither deny nor admit the plaintiff's allegation, that their (respondents') furnace is substantially like that of Elsas & Pritz. The drawing thus filed is made an exhibit hereto, and marked B B.

They deny that the complainant has, by all this, suffered any loss or injury, but on the contrary aver that by reasen of the want of the usefulness of his patent he could not have suffered any injury at all, there being many kinds of unpatented furnaces in use as good as, or much better than, that supposed to be covered by complainant's patent.

These respondents deny that they now use, or ever did use a furnace like that of plaintiff's patent, or that they have or could have realized any profits from the same. They admit that the plaintiff notified them of the pretended infringement, and that they disregarded such notice as wholly impertinent.

And, having fully answered, they pray to be hence dismissed with their full costs, already in this behalf most wrongfully sustained.

D. FRANTZ, SR.
D. FRANTZ, JR.
GEO. W. FRANTZ.

UNITED STATES OF AMERICA,
State of Kentucky, to wit:

David Frantz, sr., on his oath, says that the statements of the above answer, as far as they are made on his own knowledge respectively, are true, and as far as they are made on the information of others, he believes them to be true.

DAVID FRANTZ, SR.

Subscribed and sworn to before me by D. Frantz, sr., this 23rd day of June, 1876.

JAMES A. BEATTIE,
Com. U. S. Cir. Court, Dist. of Ky.

Geo. W. Frantz and David Frantz, jr., on their oath, say that the statements of the above answer, as far as they are made on their own knowledge respectively, are true, and as far as they are made on the information of others, they believe them to be true.

GEO. W. FRANTZ.
D. FRANTZ, JR.

Subscribed and sworn to before me by Geo. W. Frantz and D. Frantz, jr., this 26th day of June, 1876.

JAMES A. BEATTIE,
Com. U. S. Cir. Court, Dist. of Ky.

17 And on Saturday, August 19th, A. D. 1876, the following order was entered in the clerk's office:

GIDEON BANTZ
vs.
D. FRANTZ ET AL.

This day came the defendants, by John M. Harlan and Lewis N. Dembitz, esq'r's, their attorneys, and filed demand, in accordance with rule 66 in equity, a dismissal of the above cause.

And on Monday, August 21st, 1876, the following order was made, viz:

GIDEON BANTZ
vs.
D. FRANTZ ET AL.

This day came the complainant, by Messrs. Hatch & Parkinson, his solicitors, and lodged in the clerk's office his replication herein.

And on Friday, January 26th, A. D. 1877, the following order was made, viz:

GIDEON BANTZ
vs.
DAVID FRANTZ ET AL.

Upon motion of the complainant it is ordered that the replication in the above-entitled cause, lodged with the clerk August 21st, 1876,
18 be filed nunc pro tunc as of the date at which it was due.

We consent to the above.

HATCH & PARKINSON,
Sol's for Complainants.
LEWIS DEMBITZ,
Sol. for Defendants.

The replication above referred to is in the words and figures following, to wit:

Replication.

Circuit court of the United States for the district of Kentucky (at Covington). In equity.

GIDEON BANTZ
vs.
DAVID FRANTZ ET AL. } No. 793.

The replication of the above-named complainant to the answer of the above-named defendants.

This repliant saving and reserving to himself, now and at all times hereafter, all and all manner of benefit and advantage of exception which may be had or taken to the manifold insufficiencies of said answer, for replication thereunto, says that he will aver, maintain, and prove his bill of complaint to be true, certain, and sufficient in law to be answered unto; and that the said answer of the said defendants is uncertain, untrue, and insufficient to be replied unto by this repliant; without this, that any other matter or thing whatsoever in the said answer contained, material or effectual in the law to be replied unto and not herein and hereby well and sufficiently replied unto, confessed and avoided, traversed or denied, is true; all which matters and things this repliant is and will be ready to aver, maintain, and prove as this honorable court shall direct, and humbly prays as in and by his said bill he has already prayed.

HATCH & PARKINSON,
Solicitors for Complainant.

Notice to take testimony orally.

Circuit court of the United States for the district of Kentucky. In equity.

GIDEON BANTZ
vs.
DAVID FRANTZ ET AL. } No. 793.

The respondents will take notice that the complainant desires that all the testimony in the above named cause shall be taken orally, under the 67th rule in equity, as amended.

HATCH & PARKINSON,
Solicitors for Complainant.

Service acknowledged this Jan. 18th, 1877.
LEWIS N. DEMBITZ,
Solicitor for Defendants.

19 And at a term of our said court, held for its December term, A. D. 1876, and on a day of said term continued and held, to wit, on January 26th, 1877, the following order was made, viz:

GIDEON BANTZ
vs.
DAVID FRANTZ ET AL.

Upon motion of the complainant it is ordered that the time for taking testimony be extended to the third Monday in April. The witnesses, if examined at Cincinnati or Louisville, may be examined orally; if at other places, by written interrogatories and cross-interrogatories.

Here follows copy of stipulation between parties.

Stipulation.

Circuit court of the United States for the district of Kentucky. In equity.

GIDEON BANTZ
vs.
DAVID FRANTZ ET AL.

It is stipulated and agreed by and between the parties to the cause above named, that any notary public selected by either party may act as examiner under the 67th rule in equity,

HATCH & PARKINSON,
Solicitors for Complainant.

LEWIS N. DEMBITZ,
Solicitor for Defendants.

Here follows copy of depositions of parties.

20 Circuit court of the United States for the district of Kentucky. In equity.

GIDEON BANTZ
vs.
DAVID FRANTZ ET AL.

The respondents will take notice that the complainant will examine witnesses in the above named cause, under the 67th rule in equity as amended, before competent authority, examiner, at the office of Hatch & Parkinson, No. 8 West 3rd street, Cincinnati, Ohio, on Thursday, the 14th day of September, 1876, beginning said examination at 9 o'clock a. m. of said day, and continuing from day to day until completed.

HATCH & PARKINSON,
Solicitors for Compl't.

21 *Depositions.*

Circuit court of the United States for the district of Kentucky (at Covington). In equity.

GIDEON BANTZ, COMPLAINANT,
vs.
D. FRANTZ ET AL., DEFENDANTS. } No. 793.

Examination of witnesess on behalf of the complainant under the 67th rule in equity, as amended, pursuant to the annexed notice.

Present, Mr. R. H. Parkinson, for the complainant; and for the defendants.

By request of parties, it is ordered that these depositions be taken by question and answer.

Mr. JEREMIAH F. TWOHIG, of Cincinnati, Ohio, a witness produced on behalf of the complainant, being first duly sworn, deposeth and saith, in answer to interrogatories propounded to him by R. H. Parkinson, Esq., of counsel for the complainant, as follows:

Question 1. State your name, age, residence, and occupation.

Answer 1. My name is Jeremiah F. Twohig; I am nineteen years old; I live in Cincinnati, and I am a clerk.

Q. 2. State whether at any time during the past year you have been in the tannery of D. Frantz & Sons, at Louisville, Kentucky, and, if so, whether you observed the furnace used by them in said tannery.

A. 2. I was in that tannery on the 27th day of last January, and have observed the furnace used by them, and did so then; this furnace was being used at the time I was there.

Q. 3. Please describe fully the construction and operation of said furnace.

A. 3. The furnace was a double furnace, having two boilers, which were not located directly over the fire chamber, but were in front of the furnace. The fire chambers had six holes to admit the wet tan, which was hauled over and dumped into them on top of the fire chambers, and these holes were all on top of the chamber. The flames passed from the fire chamber up through a throat-like aperture which was inclined, and thence under the boilers, and then the smoke came through the boilers again in a flue, and then passed up into the stack at the front of the furnace. The boilers rested on the rear wall of the furnace, I think. There were four holes right under the boiler, opening on the outside of the furnace and on each side of the furnace, which I was told by a workman were for the purpose of cleaning out the soot, and that they didn't use them for any other purpose but for that. There were four holes right under the grate bars, or at the side of the fire chamber, which were open from the outside and were used for the purpose of creating a draft and cleaning out the ashes, etc., that settled there. There was also a door at the back end of the furnace, from which a person could see the entire length of the flue under the boilers. Wet tan was the only fuel used while I was there; I saw no other fuel about the place, and the fireman said they only used other fuel when they went to light the fire and this they did only once a week. I made a sketch of this furnace as I saw it, and that sketch is on file in this case with my original affidavit. I now attach a copy of that sketch, also made by me, and make it a part of this my deposition, and mark it Exhibit Franz Furnace. I would also say that the walls of the furnace were quite thick, so far as I could see by looking up through the open doors at the mouth of the fire chamber, and there was a wall, as I was told by a workman, which divided the fire chamber into two compartments, but I couldn't see that clearly, as the furnace was in full blast.

Q. 4. Describe more particularly the location of the combustion chamber with reference to the boiler?

22 A. 4. Well, the combustion chamber was right back of the fire chamber, and directly under the front end of the boiler, and communicated directly with the fire chamber, by means of an aperture for that purpose. The fire chamber was built some six feet down in a pit cut into the ground, and on the level of the ground above it

were the holes where the wet tan was put in, and the boilers were not over the fire chamber but were to the back of it, and the front end of the boiler was about over the rear wall of the fire chamber, and the boilers were almost on the level of the ground, but a little raised from the ground so as to be on the bottom a little above the level of the tops of the holes for feeding the fire with wet tan. This is as I remember it.

Q. 5. Please state how correctly the drawing to which you have referred represents the furnace of D. Frantz & Sons, and state particularly what is represented by the parts marked with letters of the alphabet.

Exhibit Frantz Furnace.

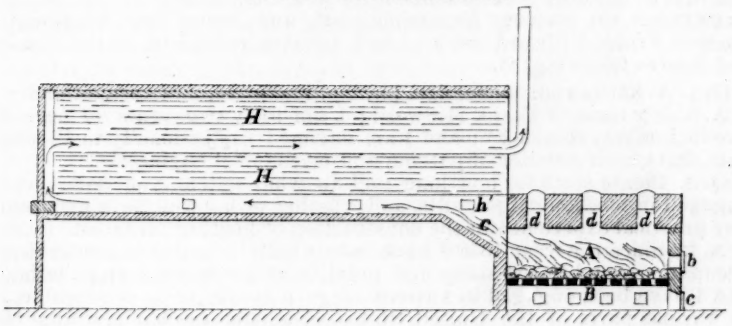


Fig. 2.

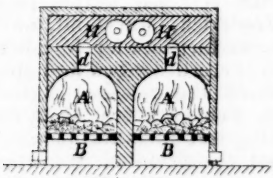


Fig. 1.

Sketch of D. Frantz & Sons' Furnace, Louisville, Ky.

23 A. 5. The drawing represents the furnace of D. Frantz & Sons correctly, with the slight exception, which I now notice, that I have made: in figure one the boilers as if they were on a level with the ground surrounding the pit in which the fire chamber is sunk. This was an oversight of mine. As I have said, the boilers should be represented as raised above the surface of the ground a little, say about four or five inches.

In figure one, B, B represent the ash pits, A, A represent the fire chamber, *d*, *d* represent the hole through which the tan is put into the fire, and H, H, are the boilers. This is an end sectional view of the furnace.

Figure two is a longitudinal section of the same. In it, *d*, *d*, *d* are the holes into which the tan is put, *b* is a door leading directly to the fire chambers, and a little above the level of the grate, for the purpose of starting the fire. I should say, *c* is the combustion chamber and

also the induction throat through which the fire passes up to the flue under the boilers; *h* is a door on the side of the furnace, for the purpose of admitting air or cleaning out the soot which accumulates there, and the other doors, *h*, *h*, are doors for same purpose; H, H shows the boiler, and B shows the grate.

JEREMIAH F. TWOHIG.

Deposition of Frank Millward.

Examination in chief:

Also, at the same time and place came one FRANK MILLWARD, who was first duly sworn and examined for the complainant by Mr. R. H. PARKINSON, the attorney for complainant, and, being thus examined, the said Frank Millward deposes and testifies as follows, in the words and figures following, viz:

Q. 1. What is your name, age, place of residence, and occupation?

A. 1. My name is Frank Millward; I am forty-two years of age; I live in Ludlow, Kentucky; and I am engaged professionally in Cincinnati, Ohio, as a solicitor of patents and mechanical engineer.

Q. 2. Please state for how long and to what extent you have been engaged in mechanical pursuits, and whether or not you have ever had any practical experience in the construction of heating furnaces.

A. 2. Since the year 1850 I have been wholly engaged in mechanical occupations, and in the study and practice of mechanical engineering, and I have been engaged in various large manufactories of machinery in various parts of the United States as master mechanic, draughtsman, etc. During this time I have frequently made plans for the construction of, and have superintended the erection of, steam-boiler furnaces and other heating apparatus.

Q. 3. Have you examined the reissued letters patent, No. 4731, granted to Gideon Bantz, of Frederick, Maryland, on February 6th, 1872, for an improvement in boiler furnaces for burning wet fuel, and do you understand the invention there described and specified?

A. 3. I have carefully examined the reissued letters patent, No. 4731, granted to Gideon Bantz, February 6th, 1872, for an improvement in boiler furnaces for burning wet fuel, and believe I understand thoroughly the construction and operation of the apparatus shown therein.

Q. 4. Please examine the Exhibit "Frantz Furnace," attached to the deposition of Je emiah F. Twohig, herein, and the explanation of the same given in the said deposition, and state how the same compares with, or differs from, the invention set forth, described, and specified in the specifications and drawings of the reissued patent 4731, granted to Gideon Bantz, referred to in your last answer, and specified in the 1st and 3rd claims thereof. Give your reasons fully.

A. 4. I have examined the said exhibit, and the drawings of it, and the deposition of Jeremiah F. Twohig, and I believe I understand the boiler furnace therein shown and described. In order that my comparison may be understood, I will state what I understand to be the essential construction of the improvement specified in the Bantz reissue, with which the Frantz furnace has any relation so far as shown by the exhibit and deposition of Mr. Twohig. The first claim of the reissued letters patent, No. 4731, I find to be as follows:

24 "In a furnace burning wet fuels, having two or more single fire chambers, not arranged under the boilers, the combustion-chamber or reservoir C, arranged above the top of said fire-chamber

and located directly under the front end of the boiler, essentially as described." This part of the invention is set forth as important in the following language of the patent: "The effect of the principal part of my invention, which consists in the location and arrangement of the reservoir C, with respect to the boiler and fire-chamber, is that the products of combustion and heat are caused to leave the fire-chambers through the throat E E, in immediate and direct contact with the boiler, and the said chamber and reservoir are constantly caused to be heated in an intense degree and to give out that intense heat upon the boiler without passing through an intermediate flue, while at the same time the boiler occupies no space within or above the fire chambers.

"A very important feature of this furnace is the location of the combustion-reservoir above the fire chambers, as thereby the products of combustion are not forced out of a natural draft, but merely follow their natural tendency to rise in said reservoir." I find that the furnace shown and described in the exhibit "Frantz furnace" and Mr. Twohig's deposition is one having two fire-chambers, constructed to burn wet fuel, the fire-chambers not being arranged under the boiler, and a combustion-chamber or reservoir, which is arranged above the top of said fire chambers and located directly under the front end of said boiler, and substantially as shown and described in the Bantz reissue patent, No. 4731. The Frantz furnace has all the advantages and the same method of operation which is peculiar to the Bantz furnace, as contemplated in the Bantz patent. I am of the opinion, therefore, that the Frantz furnace embraces the particular improvement specified in the first claim of the Bantz reissue No. 4731.

And for the reason that the Frantz furnace has a door opening into the combustion-reservoir, to which I have just referred, this door serving to admit any desired quantity of atmospheric air to this reservoir or chamber, as is required by the different circumstances, I am of the opinion that this furnace also embraces the particular improvement specified in the 3rd claim of the letters patent No. 4731, which reads as follows:

"3. In combination with the combustion-chamber or reservoir C, arranged and located as described, I claim the side door or doors *h* for the admission of atmospheric air for the purpose described."

Q. 5. Were you examined as a witness in the suit of this complainant against Jacob Elsas and Samuel Pritz, tried and adjudicated in the U. S. circuit court in and for the southern district of Ohio, at the June term, 1874, and did you examine in that behalf the furnace of those defendants, for the use of which that suit was brought?

A. 5. I was examined as a witness in that case, and did examine the furnace referred to.

Q. 6. Please state how that furnace compared in respect to the claims one and three of the patent here sued upon with the furnace of D. Frantz & Sons, to which you have referred above.

A. 6. So far as relates to the comparison between the Frantz furnace and the Elsas & Pritz furnace and the first and third claims of the Bantz reissue there is no substantial difference between the Frantz furnace and the Elsas & Pritz. They both have the combustion-chamber located with reference to the fire-chamber, and the end of the boiler exactly as defined in the Bantz reissue, and they both have the side doors opening into the combustion-chamber exactly as and for the purpose provided in the Bantz reissue, and there is no difference between them in this respect. The only difference between the Frantz and Elsas & Pritz furnaces, and that is not an essential one, obviously, so far as

this comparison is concerned, is that *in that* in the Elsas & Pritz the heat and smoke passed up the chimney at the rear of the boiler, while in the Frantz furnace the heat and smoke returns through a flue in the boilers to the front part of the furnace, and thence up the stack.

FRANK MILLWARD.

25 UNITED STATES OF AMERICA,
Hamilton County, State of Ohio, ss:

I, Charles B. Willey, a notary public in and for State and county aforesaid, do certify that the above and foregoing depositions of Jeremiah H. Twohig and Frank Millward were taken before me at the office of Hatch & Parkinson, attorneys at law, No. 8 west 3d street, Cincinnati, county and State aforesaid, on the 14th day of September, 1876, in accordance with the notice hereto annexed; that said witnesses were each first sworn by me that the evidence they should give in the above named action should be the truth, the whole truth, and nothing but the truth, before giving their testimony; that the testimony of each of said witnesses was written by me, and read to and subscribed by him in my presence.

In testimony whereof I have this day and year aforesaid set hereunto my hand and official seal.

[SEAL.] CHARLES B. WILLEY,
Not. Pub. Ham. Co.

26 *Cross examination.*

Also, on September 25, 1876, at the same place, by consent of counsel, Mr. FRANK MILLWARD, witness for complainant, is recalled for cross-examination.

Present, Mr. Parkinson, for complainant, and Mr. Dembitz, for respondents, and any further certificate than the foregoing is now waived.

HATCH & PARKINSON,
For Complainant.
LEWIS N. DEMBITZ,
For Defendants.

Cross-examined by L. N. DEMBITZ, counsel for defendants:

X Question 1. Look at the drawing now here shown you on tinted paper and colored, and state whether or not it is, to the best of your recollection, a correct drawing of Frantz & Son's furnace.

Answer 1. I have never seen the Frantz furnace, and therefore cannot say.

X Q. 2. Is your judgment of the Frantz furnace made up entirely from looking at Mr. Twohig's drawing?

A. 2. Not altogether. It is made up from the drawing and the deposition attached thereto, or connected therewith.

X Q. 3. Do you recollect what Mr. Twohig says of the side doors causing a draft? If so, state in what manner such draft, according to your knowledge of physics, can be regulated by such doors, and what would be the effect of closing and what of opening them.

A. 3. I don't recollect the exact language as to this point.

X Q. 4. According to what you recollect of those side doors please describe their effect.

A. 4. If the question refers to the side door which admits air into the combustion chamber I say the effect of such door is that the draft can be regulated thereby and air admitted as required.

X Q. 5. What would be the effect of admitting air by those side doors upon the fire?

A. 5. Does the word fire refer to the fuel or what?

X Q. 6. The blaze.

A. 6. That depends upon the condition or intensity of the flame.

X Q. 7. Would the effect be generally to heighten the draft and make the blaze more violent, or the contrary?

A. 7. If the air is admitted as the condition of the gases of the combustion chamber require the tendency would be to increase combustion, and consequently increase the draft as it is called.

X Q. 8. Are you acquainted with Thompson's patent on wet-fuel furnaces?

A. 8. No, sir.

X Q. 9. Is not the use of side doors in the rear of furnaces of all kinds very old?

A. 9. Not that I know of. It is common to use front doors for the admission of fuel, &c.

X Q. 10. How long have you been acquainted with the construction of furnaces of various kinds?

A. 10. Since I was fifteen years old.

X Q. 11. Had none of those furnaces any side doors until you saw those of Bantz's patent, or those for wet fuels, which seem to infringe on this patent?

27 A. 11. I never recollect seeing a steam boiler furnace so made so that the fire or fuel chambers were in advance of the front end of the boiler, both five chambers communicating with a combustion chamber or reservoir located under the front end of said boiler, before I saw the wet fuel boiler furnace of Elsas & Pritz of this city. Consequently I say that I have never seen a boiler furnace having such construction with a side door or otherwise, before that time. It has been common of late to make bridge walls of ordinary steam boilers hollow, and to admit into the hollow chambers therein atmospheric air, some of which have been controlled by registers or valves. I do not, however, know the relative dates.

X Q. 12. When you say that you are not acquainted with Thompson's patent, do you mean to say that you have never heard about it at all?

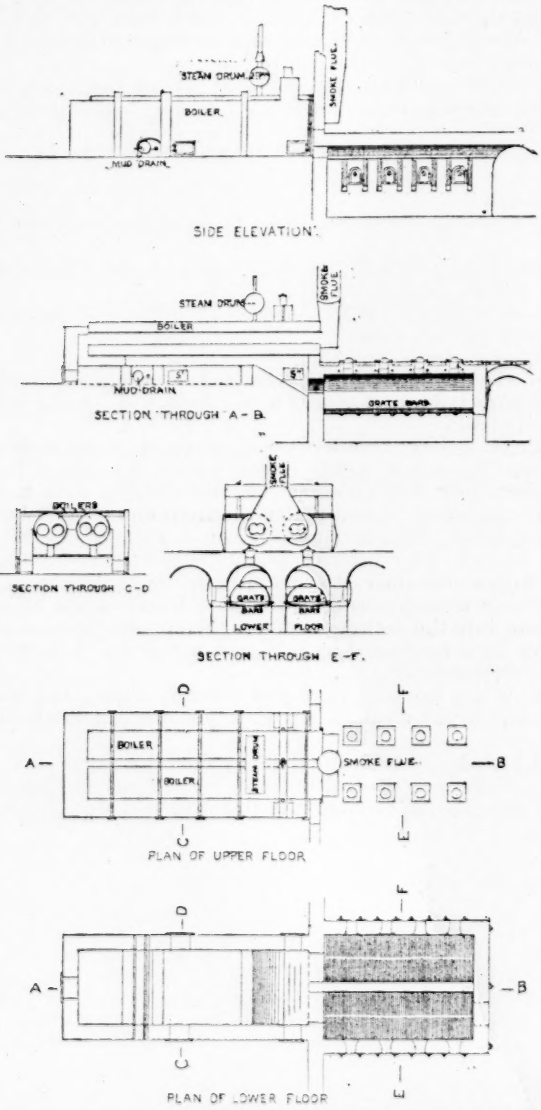
A. 12. I have heard of it for the first time this morning.

X Q. 13. Examine the drawing now shown you and say in what respects, if any, it differs from the drawing and description given by Twohig.

Respondent's Exhibit A A.—Chas. B. Wilby, notary.

Diagram referred to in deposition of D. Frantz, jr., Oct. 23, 1876.

CHAS. A. GRAHAM, *Notary.*



C. G. ROSENPLANTER,
Resident & Civil Engineer.

LOUISVILLE, KY.

28 (Question objected to by Mr. Parkinson, as the drawing referred to is not in evidence. Counsel for respondents now offers in evidence the drawing referred to by him in cross question 13, and makes it part hereof, and mark' it Respondents' Exhibit A A.—Chas. B. Wilby, notary.)

A. 13. So far as it relates to the questions arising in this controversy it differs in no material respect.

X Q. 14. Do you consider side doors at the rear of the furnace for the purpose of taking out ashes and mud as an infringement of the Bantz patent?

A. 14. No.

X Q. 15. Are you well acquainted with tannery and sugar furnaces?

A. 15. No, sir.

X Q. 16. Have you ever seen any wet fuel furnace, except or before you saw that of Elsas & Pritz?

A. 16. I think not.

X. Q. 17. Have you ever studied up the progress of the art of making such furnaces? Do you know the various kinds of them patented and unpatented that are in use?

A. 17. I have not become familiar with the state of the art fully as to furnaces devoted to the burning of wet fuels, and I am not familiar with all the patented improvements in that line, or indeed with any except with the Bantz patent, and I have not seen any in use except the one at Elsas & Pritz's. With the construction and operation of that I am familiar.

FRANK MILLWARD.

For certificate see agreement preceeding.—NOTARY.

DEFENDANTS' TESTIMONY.

The deposition of David Frantz, jr., F. Kannel and L. Pratt, taken on the 23rd day of October, 1876, at the office of Graham & Hardacre, at Louisville, county of Jefferson, and State of Kentucky, to be read as evidence on behalf of the respondents, in an action between Gideon Bantz, plaintiff, and David Frantz & Sons, defendants, now pending in the U. S. circuit court, Kentucky district, both parties, by attorneys, being present.

Deposition of David Frantz.

DAVID FRANTZ, jr., being duly sworn and examined by Mr. Dembitz, as attorney for the respondents, deposed as follows:

Question 1. Are you one of the defendants in this case?

Answer 1. Yes, sir.

Q. 2. How old are you?

A. 2. I am 41½ years old.

Q. 3. How long have you been engaged in the trade of tanning?

A. 3. All my life—ever since I have been able to do anything.

Q. 4. How long has your firm, or the firms of which it is a successor, been keeping the tannery in which you now are?

A. 4. Since May, 1848.

Q. 5. When did you first use in your tannery a furnace for wet fuel?

A. 5. We have been burning wet fuel in an ordinary coal furnace ever since I can remember, but as a regular tan burner since October, 1856.

Q. 6. Who put the tan burner up for you?

A. 6. Well, there was a man by the name of Clark, J. C. or J. L., an agent for Moses Thompson. It was put up in 1856.

Q. 7. Is that the same Moses Thompson who claimed a patent on the furnace?

A. 7. It is the same one. He claimed a patent at that time.

Q. 8. Did your firm pay him anything for the patent?

29 A. 8. We bought the right to use that furnace for all time to come.

Q. 9. For how much?

A. 9. I don't know whether it was $150 or $250. I think it was $250.

Q. 10. What was the style of the firm at that time?

A. 10. The style of that firm at that time was A. M. Taylor & Co.

Q. 11. Was your father the company?

A. 11. Yes, sir.

Q. 12. What are the changes through which the firm has been since?

A. 12. There have been two changes since, from A. M. Taylor & Co., to H. W. Taylor & Co., and then to D. Frantz & Son.

Q. 13. What became of the Thompson furnace which you put up in 1856?

A. 13. That furnace, we run it as long as it lasted, making a change, we remoddled it next spring—1857, and when it was burned out we tore it down and used an ordinary coal furnace again for a few years. Then we put up one something similar to it, and we used that until we put up the present furnace two years ago.

Q. 14. What was the cause of your putting up the present furnace in place of those you had before?

A. 14. The furnace that we had before was burnt out, and did not answer the purpose altogether. We put up this furnace, thinking to improve on the matter, which we did.

Q. 15. Look at Mr. Rosenplanter's drawing, and state whether or not the same is in all particulars a correct drawing of your furnace.

A. 15. That plan is a correct drawing of our present furnace.

Q. 16. Look particularly at the two square doors and the round door marked "drum."

A. 16. The "mud drum" is not a door. It is all closed up. The surroundings of the "mud drum" is all walled up. That is the head of the drum.

Q. 17. State about the two oblong doors S^1 and S^1—what they are used for.

A. 17. They are used for taking out ashes, cleaning out principally. The same as in every ordinary coal furnace. It is nothing more than what has been in existence for the last 50 years, or since a boiler has been a boiler.

Q. 18. What is the effect upon the fire when those doors are open?

A. 18. Very injurious. They check the draft—do more injury than they do good, but they are bound to be there to clean out. If it was not for that we would not have them there at all.

Q. 19. Are there similar doors on the opposite side of the furnace, or are they on both sides?

A. 19. They are on the other side as they are here.

Q. 20. Are they too near the wall on the other side to be used?

A. 20. No, sir.

Q. 21. Look at the opening which I have marked O, and state how wide and high it is?

A. 21. That is about five feet at the bottom in width, and then it is

arched over. The top of the arch is about three feet high in the center. It is oval on top. It is the full size of the arch, with the exception of a few brick in the bottom—no flue or nothing at all there.

(Counsel for plaintiff declined to cross-examine.)

30 *Deposition of Frederick Kannel.*

Also the deposition of FREDERICK KANNEL, taken at the same time and place, and in the same behalf. The said witness being duly sworn, deposes as follows:

Direct examination by Mr. DEMBITZ:

Q. 1. How old are you?

A. 1. 52.

Q. 2. What is your trade?

A. 2. Laborer.

Q. 3. Have you been laboring about tanneries?

A. 3. Yes, sir.

Q. 4. At what time were you engaged in the tannery now owned by Frantz & Son.

A. 4. In 1856.

Q. 5. What month of 1856?

A. 5. It was the last month in the year—December, 1856.

Q. 6. Did you go there in December or leave in December?

A. 6. I came there in December.

Q. 7. When did you leave?

A. 7. I worked there eleven years. I cannot tell the date exactly, it has been so long.

Q. 8. What kind of furnace did you find there at that time?

A. 8. There was one furnace on one side, and one on that, and the fire runs together in the front—there was two flues.

Q. 9. What changes did you make on that furnace during the time that you had it.

A. 9. I have to keep the ashes what comes from the fire—it settled under the boiler, and the fire would not draw right, and I made it deeper myself, so that the fire draws better.

Q. 10. How deep was it before you took out the settled ashes, and how deep was it afterwards?

A. 10. It was about one and a half feet before I took it out. I believe it was about three feet deep afterwards. I cannot tell exactly, but that is what I believe.

Q. 11. Do you recollect whether the furnace was known by the name of some patent?

A. 11. No, sir; at the time that I came the furnace was built already.

Q. 12. You don't know anything about the patent?

A. 12. No, sir.

Q. 13. When you came it was built already?

A. 13. Yes, sir.

Q. 14. Was there any side doors in the back chamber?

A. 14. Yes, sir.

Q. 15. How many?

A. 15. There was one side door; we opened that to stop the fire and cool off the boiler; another on that side so as to put the ashes out. There was another door, and every two weeks we walled it up. We would get the ashes out and then wall it up again, and then there was the same on the other side.

Q. 16. One of the side doors you opened when you wanted to cool the fire off?

A. 16. Yes, sir.

Cross-examination by Mr. HATCH:

X Q. 1. Are you still at work for Mr. Frantz?

A. 1. No, sir.

X Q. 2. How long since you worked for Mr. Frantz?

A. 2. Eleven years since 1856, and then I left.

X Q. 3. You have not been to work for him since then—since 1867.

A. 3. Yes, sir, about three months.

X Q. 4. Recently?

A. 4. I worked on the beam inside of the yard about a year ago.

X Q. 5. Did you work about the furnace at all during the last time that you were in his employ?

A. 5. The first time that I worked for Mr. Frantz I worked all the time on the furnace. The last time I didn't work on it at all.

31 *Deposition of Lawrence Pratt.*

Also the deposition of LAWRENCE PRATT, taken at the same time and place and in the same behalf. The said witness being duly sworn and examined by Mr. Dembitz, deposed as follows:

Q. 1. What is your age?

A. 1. Fifty-five.

Q. 2. What are you by trade?

A. 2. Tanner.

Q. 3. How long have you been a tanner?

A. 3. About twenty-four years.

Q. 4. At what time did you work at the tannery now owned by D. Frantz & Sons?

A. 4. I believe it was in 1854 that I came there, in the fall. I cannot tell exactly the month.

Q. 5. How long did you stay there?

A. 5. I stayed there about two years.

Q. 6. In what month did you leave?

A. 6. It was in the fall. I cannot tell the month. It was in 1856, in the fall, about winter.

Q. 7. While you were there, was they any new furnace put up?

A. 7. I worked on the furnace.

Q. 8. On putting up the new furnace?

A. 8. Yes, sir. I was there when they put it up.

Q. 9. Who put it up?

A. 9. It was a man of forty-five or fifty, by the name of Thompson. He was there the whole day, in the morning and evening.

Q. 10. Did you hear how Mr. Kannal described that furnace?

A. 10. No, sir.

Q. 11. Tell yourself what kind of a furnace it was.

A. 11. It was a furnace with two arches drawing through both arches to one boiler. The flues went right under the boiler, and the chimney was behind. It was no flue-boiler. There was three doors on one side, on the right side of the boiler when you stand on the front. The first door was to cool off, right next to the front. The other two were to clean out the ashes.

Q. 12. Say how wide and how deep that flue under the boiler was.

A. 12. I cannot tell that exactly. It was dug out in front, for to cool

off where the flue goes in. We didn't dig it out. It was dug out before. We didn't put in a new boiler. We made the furnace right in front.

Q. 13. The three doors were under the boiler, were they?

A. 13. Yes, sir.

Q. 14. In the flue?

A. 14. Yes, sir. They were on the side.

Q. 15. Was the bottom of the flue brick, or was it the natural ground?

A. 15. It was all built up with fire-brick; the arch was fire-brick.

Q. 16. What was on the side opposite to the three doors? Were there any doors on the opposite side?

A. 16. No, sir; the boiler was walled up, and the doors were below. The boiler was all covered up with brick.

Q. 17. You spoke of three doors on one side; were there any doors on the opposite side?

A. 17. The other side it was too close to the house, and we could not make any doors.

Q. 18. Was there any hole broke into the opposite side occasionally?

A. 18. No, sir; not that I know of.

Q. 19. I mean, did you take out the bricks occasionally?

A. 19. No, sir; we never took the brick out.

(Counsel for plaintiff declined to cross-examine.)

32 STATE OF KENTUCKY,
Jefferson County:

I, Charles A. Graham, a notary public, duly commissioned and qualified as such, in and for the county of Jefferson, and State of Kentucky, do hereby certify that, in pursuance of an agreement hereto annexed, I was attended at my office, 105 5th street, in the city of Louisville, and county and State aforesaid, on the 23d day of October, A. D. 1876, and between the hours of eight o'clock a. m. and six o'clock p. m. of said day, by D. Frantz, jr., Frederick Kannel, and Lawrence Pratt, witnesses of sound mind and lawful age, and that they were by me carefully examined, cautioned, and sworn to testify the truth, the whole truth, and nothing but the truth, of their knowledge touching the action mentioned in the caption. That their examination was by me reduced to writing in their presence, read to them in my presence, both parties being present by attorney; the signatures of said witnesses being waived per agreement attached. I have retained said deposition' in my possession for the purpose of forwarding the same with my own hand to the court for which the same were taken. I further certify that I am not of counsel or attorney for either of the parties in said depositions named, or in any way interested in the event of the said cause named in the caption.

In testimony whereof I have hereunto set my hand and seal
33 this the 23rd day of October, in the year of our Lord one thousand eight hundred and seventy-six.

[SEAL.] CHAS. A. GRAHAM,
Notary Public.

The agreement above referred to is in the words and figures following, to wit.

Agreement.

GIDEON BANTZ
vs.
DAVID FRANTZ & SON.

OCT. 23RD, 1876.

It is hereby agreed between Hatch & Parkinson, attorneys for plaintiff, and L. N. Dembitz, attorney for defendant in the above entitled cause, now pending in the United States circuit court, Ky. district, that the depositions of D. Frantz, jr., F. Kannel, and L. Pratt may be taken by Charles A. Graham, notary public, waiving signature of witnesses.

HATCH & PARKINSON,
Attorneys for Plaintiff.
LEWIS N. DEMBITZ,
Attorney for Defendant.

34 *Original patent of Gideon Bantz.*

United States Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Gideon Bantz, dated 22d June, 1858, No. 20616.

In testimony whereof I, Elisha Foote, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this twenty-third day of February, in the year of our Lord one thousand eight hundred and sixty-nine, and of the Independence of the United States the ninety-third.

[SEAL.] ELISHA FOOTE.

The United States of America to all to whom these letters patent shall come:

Whereas Gideon Bantz, of Frederick, Maryland, has alleged that he has invented a new and useful improvement in furnaces for heating steam boilers, etc., which he states has not been known or used before his application; has made oath that he is a citizen of the United States, that he does verily believe that he is the original and first inventor or discoverer of the said improvement and the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in said improvement, and praying that a patent may be granted for that purpose:

These are, therefore, to grant, according to law, to the said Gideon Bantz, his heirs, administrators, or assigns, for the term of fourteen years from the twenty-second day of June, one thousand eight hundred and fifty-eight, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Gideon Bantz in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this twenty-second day of June, in the year of our Lord one thousand eight hundred and

fifty-eight, and in the Independence of the United States of America, the eighty-second.

JACOB THOMPSON,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.
[L. S.]

J. HOLT,
Commissioner of Patents.

35 *Schedule.*

The schedule referred to in these letters patent, and making part of the same.

[The drawings accompanying this patent are duplicates of those attached to the reissue, for which see page .]

To all whom it may concern:

Be it known that I, Gideon Bantz, of Frederick City, in the county of Frederick, and State of Maryland, have invented a new and improved furnace for heating steam boilers and other apparatus, and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a longitudinal vertical section of the furnace, showing its application to a steam boiler.

Figure 2 is a transverse vertical section through the fire-chambers, in the plane indicated by the line *x x* of figure 1.

Figure 3 is a transverse vertical section through one of the reverberating chambers, in the plane indicated by the line *y y* of figure 1.

Similar letters of reference in each of the several figures indicate corresponding parts.

The object of this invention is the more perfect combustion of tan, saw-dust, bagasse, and all other kinds of refuse fuel, in a wet or dry state, as well as of wood or coal. It is, however, with particular advantage to the burning of wet fuels.

My invention consists in the arrangement embracing, for united use, in the manner and for the purpose hereinafter specified, the following features, to wit:

First, two or more arched fire-chambers, with throats of less area than their capacity; second, an auxiliary combustion-reservoir or chamber, with cima reversa shaped bottom, and side draft door; third, a series of reverberatory-chambers with side draft doors and passages at top for communication with each other; and, fourth, a diving or direct flue leading into the chimney or smoke-stack.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction ond operation.

A A are two arched fire-chambers, arranged side by side, furnished with grates, *a a*, having ash-pit B B provided below the said grates. These fire-chambers are not placed below the boiler H, but directly in front thereof, and longitudinally parallel therewith. They may, however, be placed at one side of the boiler, and at any angle to it. Each is provided with the usual door *b*, but these are only used for lighting the fires, and the ash-pits are provided with doors *c* to regulate the supply of air through the grates, and permit the cleaning out of ashes. On

the top of each chamber there are feeders *d d* for supplying the fuel, but as these feeders are the same as used in other furnaces, no particular description of them is necessary. The fire-chambers are covered with a flat floor built over the arches, that the fuel may be wheeled to the feeders in barrows, or brought in any other convenient manner. At the rear end of each fire-chamber there is a throat-like aperture *e* communicating with what I term the reservoir C, which is built of brick, lined with fire-brick, under the front portion of the boiler, and which has a concave bottom *m* and convex back *n*, which are formed by a cima reversa shaped plate. By having the bottom and back of the reservoir formed by a cima reversa shaped plate, the throat *e* is not partially closed up, as it would be if the plate was straight and set inclined, and, beside this, the heated products of combustion are made to hug the bottom of the boiler, and as the draft is at this point, the perfect combustion of partially ignited gases is insured. The convex back of the reservoir terminates in and serves as a bridge-wall, and has a concave top so formed as to leave a space, *o*, of but three or four inches between it and the boiler.

36 The purpose of the reservoir will be presently explained. In rear of the bridge-wall *f* there is a series of reverberatory chambers D D D two, three or more, one behind the other, the series extending nearly as far as the rear end of the boiler, and the said chambers being severally separated by bridge walls, *g g*, and each chamber being provided with one or more doors *h*, in either or both sides, for the purpose of admitting air in sufficient quantities either to complete the combustion of the gases from the fire-chambers or to check the draft. The reservoir is furnished with a door h^1, for a similar purpose as those *h h* in the reverberatory chamber. At the rear of the hindmost reverberatory-chamber there is a wall g^1, like *g g*, behind which there is a diving or drop flue E leading to the chimney.

The operation of the furnace is as follows: The gaseous products of the combustion in the fire chamber A A escape by the throats *e e* into the reservoir C, where they mingle together, and the combustible portion thereof becomes ignited, and where their heat acts upon the boiler, and from whence they pass into one after another of the reverberatory-chambers, in each of which a portion of their heat is abstracted by contact with a portion of the boiler, and finally they descend the flue E to the chimney. The effect of the principal portion of my improvement, which consists in the employment of the reservoir C, connected with the fire-chambers by the throats *e e*, of much smaller transverse area than the fire-chamber, is that the products of combustion and heat are prevented leaving the fire-chamber too rapidly, and the said chambers are consequently caused to be heated to an intense degree, and a very nearly perfect combustion of the fuel is obtained therein, and when the gaseous product of combustion leave the fire-chambers by the said throats and arrive in the reservoir C, the side walls and curved bottom and back of which are kept at a white heat, the still combustible portion of the gaseous products is ignited under the boiler.

In the management of the furnace, care should be taken to supply the charges of fuel to the two fire chambers alternately, as nearly as possible at regular intervals, so that in one there may be always a bright fire. At night or at any time when no steam is required from the boiler, or when the generation of heat is not required, the two front feeders should be filled up with fresh fuel, the ash-pit doors closed up, and one or more of the doors *h h* opened to prevent more than a very limited supply of oxygen to the fire-chambers, so that such a degree of heat may be kept

that on the doors *h h* being closed and the ash-pit doors opened to let the fire burn briskly, the boiler, or other apparatus, heated by the furnace may be at once ready for operation. The doors *h h* in the reverberatory-chambers, besides being used to admit cool air in sufficient quantity to prevent draft and keep the fire damped, may be also employed to admit air in more limited quantities, to effect the combustion in the reverberatory-chambers of any inflam'able gases that may pass the reservoir C.

It is proper to state that instead of two fire-chambers, three or more may be used, the same being constructed and arranged in the same manner, and all communicating with the same reservoir each by a contracted throat, *e*.

What I claim, as my invention, and desire to secure by letters patent, is—

The arrangement of fire-chambers A A, contracted throats *e e*, auxiliary combustion-reservoir, C, provided with the cima reversa bridge-plate *m n*, and the door h^1, reverberatory-chambers D D, with doors *h h*, and the diving or direct flue E, substantially as and for the purposes set forth.

GIDEON BANTZ.

Witnesses:
J. M. HARDING.
GEO. KAUTNER.

37 *Stipulation.*

Circuit court of the United States for the district of Kentucky. In equity.

GIDEON BANTZ
vs.
DAVID FRANTZ ET AL.

It is hereby stipulated that the above may be treated as a correct copy of the specification of which it purports to be, and may be so treated without further proof, subject to any corrections counsel may hereafter prove.

HATCH & PARKINSON,
Solicitors for Complainant.

LEWIS N. DEMBITZ,
Solicitor for Defendants.

Certificate.

STATE OF MARYLAND,
County of Frederick, to wit:

I, Henry Williams, a notary public in and for the county and State aforesaid, duly commissioned and qualified, the commissioner named in the annexed commission, in the case of Gideon Bantz vs. D. Frantz et al., in the circuit court, Kentucky district, United States of America, do hereby certify that I opened said commission on the 29th day of March, A. D. 1877, at the house of Gideon Bantz, in Frederick, Maryland, and then and there appeared before me on behalf of complainant, Gideon Bantz, a witness of lawful age, who, being by me first duly sworn to make true answers, did answer as follows the annexed interrogatories.

In testimony whereof I have hereunto set my hand and affixed my notarial seal this 29th day of March, A. D. 1877.

[SEAL.]

HENRY WILLIAMS,
Notary Public, Frederick, Maryland.

The commission above referred to is in the words and figures following, to wit:

38 The United States of America to Henry Williams, esq., Frederick, Maryland, greeting:

Know ye, that we, trusting to your fidelity and provident circumspection in diligently examining witnesses for complainant in a certain matter of controversy now pending and undetermined in our circuit court of the United States for the district of Kentucky (at Covington), wherein Gideon Bantz is complainant and D. Frantz et al. are defendants, therefore command you that at such certain days and places as you shall appoint, that you cause said Gideon Bantz to come before you and him diligently examine on oath, touching the premises, and said examination into our said court, distinctly and plainly, without delay you shall send certified and enclosed, returning also to us this writ.

Witness, Henry Bostwick, clerk of our said court, at the Federal court-hall, in the city of Covington, this 24th day of March, A. D. 1877, and of our Independence the 101st.

[SEAL.] H. BOSTWICK, *Clerk.*

39 *Testimony of Gideon Bantz.*

Question 1. Are you the complainant in this case?

Answer 1. I am.

Q. 2. State how long you have been engaged in tanning—where you first began.

A. 2. About thirty-five years. In Frederick, April 1, 1842.

Q. 3. When did you first experiment in burning tan as a fuel?

A. 3. About 1846 I commenced using it; in 1848 I succeeded in using dry tan alone to run all my machinery; August 25th, 1849, as per the annexed exhibit, marked A, you will see my operations were a complete success; the newspaper was forwarded to me by some unknown person.

Q. 4. When did you devise your plan in burning tan in a furnace separate and apart from the boiler, and applying the heat through a combustion chamber under the boiler?

A. 4. In the year 1852 I determined to do so; had devised numerous plans, but for the want of room near the boiler at that time prevented me.

Q. 5. When did you make your first complete drawing, and when did you build your furnace as patented, and how do you fix your date?

A. 5. June, 1854, I made my first drawing and dated it at the time; about August, 1854, I built my first furnace; I fix my date by the fact that at the same time I purchased a new boiler and put it in, as will be seen by annexed exhibit, marked B, the freight paid upon boiler from Baltimore, and exhibits filed in U. S. circuit court for southern district of Ohio.

Q. 6. Did you know Moses Thompson, the patentee of the so-called Thompson furnace? If so, state when and how you became acquainted with him.

A. 6. I did know him; he came to my yard in the summer of 1853; a Mr. E. S. Furneyhough, of Richmond, Virginia, having spent some time with me in obtaining information on tanning, spoke to me in reference to Mr. Thompson; on his (Mr. Furneyhough's) returning home, Mr. Thompson came to my yard and introduced himself as the friend of Mr. Furneyhough.

Q. 7. Did you ever see a furnace constituted like the drawings of the

Thompson application, marked Exhibit B, now shown you; if so, where; how did it work, and how do you fix the date? and state who used it, and give names and residences of any persons who knew of its use.

A. 7. I have seen the so called Thompson furnace in Richmond, Virginia, on S. S. Marsh's tan yard; likewise at a barrel factory; it failed to get up steam to run the engine continuously; it was stopping and starting all the time. It was a very crude affair—the first furnace he ever built. From my memorandum book I fix the date between the 2d and 8th of December, 1853. In 1854, I saw three in Frederick; my brother's, Hanshew Markey's, and my own. I saw three in Baltimore, two complete and one being built for Denmead & Co.; the names of the others I do not know; they were all failures. George Morkell, John Durall, Henry Wilson, G. Ernest Bantz, and others, of Frederick, knew of its use in Frederick.

Q. 8. How have the furnaces constructed under your patent worked?

A. 8. All that I have constructed have generally given satisfaction; I guarantee them to do so, or no remuneration.

Q. 9. Who made your original application?

A. 9. I did, myself; and had no knowledge of the practice at the time.

Q. 10. Why did you apply for a reissue?

A. 10. Through inadvertance and want of knowledge of the law I put everything in one claim, whereas the separate parts that act separately should have been claimed separately.

Q. 11. State what, if any, connection the reverberatory chambers, the diving flues, and dead chambers have with the parts claimed in the first claim, and with each other.

40 A. 11. They each perform separate functions and have distinct features. The dead chambers to keep the heat where it is needed in the burning chambers, and to keep the top as cold as possible. The reverberatory chambers to receive the heat, and by the aid of the diving flue retain it under the boiler until it has lost its vitality as far as possible. These are all separate from the first claim.

Q. 12. What is the use of the cima reversa bottom, and is it connected to your combustion chamber?

A. 12. It is to direct the flame or rays of heat more directly around and against the under surface of the boiler, and is not essential to the combustion chambers. Each one of the various claims have separate and distinct offices to perform outside of the burning chambers.

Q. 13. State any other matter that, to you, seems material or important to the case?

A. 13. My furnace has the combustion chamber immediately under the front of the boiler, where all the heat and flame meet, mingle, and consume each other. In Thompson's it is wasted in the long narrow flue.

Cross interrogatories:

X Q. 1. Was ever a furnace constructed entirely like your patent, with cima reversa bottom, with reverberatory chambers, diving flue, &c., ever built? If so, state where, and by whom, and for whom.

A. 1. I never saw one outside of those I have built, but I am informed they are erected by infringers.

X Q. 2. Do you know of anybody who is using such a furnace, with reverberatory chambers? If so, who and where?

A. 2. Not of my knowledge, but I have been told so by my experts and others that infringers are using the whole of or parts of my claims throughout the United States.

X Q. 3. Did you not state, as a witness in your own behalf, in the case of yourself against Elsas & Pritz, in the district court for the southern district of Ohio, that you made your invention, originally, in June of the year 1854, and that you applied for your patent in March, 1855?

A. 3. Yes, I did.

X Q. 4. Did you not, in that case, state that you made your first furnace in August, 1854, the next in 1859, and that the former of the two was being altered and changed, by you, more or less until perfected?

A. 4. About August, 1854; about 1859, and it was being altered and changed by me, more or less, until perfected, and the proportions being altered, but not the principle.

GIDEON BANTZ.

STATE OF MARYLAND;
County of Frederick, to wit:

I, Henry Williams, a notary public for the county of Frederick, State of Maryland, do hereby certify that the foregoing deposition was duly taken, sworn to, and subscribed before me, at the time and place mentioned.

Given under my hand and notarial seal, this 29th day of March, A. D. 1877.

[SEAL.] HENRY WILLIAMS,
Notary Pub., Frederick, Maryland.

42 *Certificate.*

STATE OF MARYLAND,
Frederick County, to wit:

I, Henry Williams, a notary public in and for the county and State aforesaid, duly commissioned and qualified, the commissioner named in the annexed commission in the case of Gideon Bantz vs. D. Frantz et al., in the circuit court for the district of Kentucky, at Covington, do hereby certify that I opened said commission on the 7th day of April, A. D. 1877, at the house of Gideon Bantz, in Frederick, Maryland, and then and there appeared before me, on behalf of complainant, Henry Wilson, John Duvall, and G. Earnest Bantz, witnesses of lawful age, who, after being by me duly sworn to make true answers, did answer as follows the annexed interrogatories.

In testimony whereof I have hereunto set my hand and affixed my notarial seal this 7th day of April, A. D. 1877.

[SEAL.] HENRY WILLIAMS,
Notary Public, Frederick, Maryland.

The commission above referred to is in the words and figures following, to wit:

The United States of America to Henry Williams, Frederick, Maryland, special commissioner, greeting:

Know ye that we, trusting to your fidelity and provident circumspection in diligently examining witnesses, to wit, Henry Wilson, G. E. Bantz, and John Duvall, in a certain matter of controversy now depending in our circuit court of the United States for the Kentucky district at Covington, wherein Gideon Bantz is complainant and D. Frantz et al. are defendants, we command you that at such certain days and places as you shall appoint, you shall call and cause the witnesses to

come, and then diligently examine on oath touching the premises; and their examination into our said court, distinctly and plainly, without delay, you shall send and certify enclosed, returning also this writ.

42 In witness whereof, Hon. Morrison R. Waite, Chief Justice of the Supreme Court of the United States, hath caused the seal of our said court to be hereunto affixed, this 4th day of April, 1877, and of our Independence the 101st year.

[SEAL.] H. BOSTWICK,
C. C. C., K. D.

43 *Testimony of Henry Wilson.*

Q. 1. State your name, age, residence, and occupation.

A. 1. My name is Henry Wilson. I am about seventy years old, and my occupation a tanner.

Q. 2. How long have you been engaged at your present employment and with your present employer?

A. 2. I have been engaged in tanning more than fifty years, and have been thirty-four years, the 29th of next June, with Mr. Gideon Bantz.

Q. 3. Did you ever know a Mr. Moses Thompson? If so, when and where, and under what circumstances did you become acquainted with him?

A. 3. I did know Moses Thompson well. When he stopped with Mr. Bantz he had some clothing to wash, and he asked me to get them washed for him, and my wife washed them for him.

Q. 4. Do you know when Mr. Bantz first began to use tan, as fuel, to run his engine?

A. 4. In 1846, I think, he first began to use it slightly. He put up his furnace in 1854. We were burning tan all the time from 1846, and I helped to dry it.

Q. 5. State fully all you know about his early use of tan as fuel.

A. 5. I have answered this in my previous answer. He was the only one that I knew of in Frederick that was using it successfully at that time.

Q. 6. Do you know whether Mr. Bantz ever made a model and drawings of a furnace for burning tan as fuel, for Mr. Thompson? If so, state all you know about it.

A. 6. I know that Mr. Bantz made a drawing and model for Mr. Thompson. I know by reason of Mr. Bantz having his work-bench and patterns in the shop at the yard where he worked.

Q. 7. Did you ever see a furnace built in accordance with Mr. Thompson's plan? If so, when, where, and who built it?

A. 7. I did see one of Mr. Thompson's furnaces in 1854, at Mr. Bantz's yard; Mr. Thompson and Mr. Bantz built it under Mr. Thompson's directions. I helped to dig the foundation for it, and helped to clean the brick of the old furnace.

Q. 8. What became of the furnace? State all you know of it, also how you fix your dates, and describe construction.

A. 8. We ran it a while and could not get along with it, and Mr. Bantz tore it down. I fed the bark-mill at the time. Mr. George Markell would come in and would throw a little bark in the mill and stop the engine, and then laugh at the engineer. I fix my date from the death of Mr. Bantz's father. Thompson's furnace had four burning chambers; the first stood against the wall of the tannery, other three to the west of it. The heat of Mr. Thompson's furnace seemed to go around the

ends through a small flue; he had nothing under the boiler that I know of.

Q. 9. Did you ever see a furnace built according to Mr. Bantz's plan, that is, having two or more single fire-chambers not arranged under the boiler, with a combustion chamber above the top of said fire chambers and located directly under the front end of the boiler? If so, where and when did you first see such furnace? State all you know about it.

A. 9. The only one I ever saw was on Mr. Bantz's yard. I helped to tear down the Thompson furnace and helped to build Mr. Bantz's, and we are using the furnace now.

Q. 10. Which was the best of these two furnaces, and to what do you attribute the superiority of the one over the other?

A. 10. Mr. Bantz's was the better, because it kept the machinery going all the time, and I attribute the superiority to the fact, as I said before, the heat seemed to pass around through the narrow flue in the Thompson furnace, and did not strike the boiler as directly as in Mr. Bantz's furnace.

44 Cross-interrogatories to HENRY WILSON.

Answer each of these cross-interrogatories addressed to Gideon Bantz.

X Q. 1. (To Gideon Bantz.) Was ever a furnace constructed entirely like your patent, with cima reversa bottom, with reverberatory chambers, diving flue, &c., ever built? If so, state where, and by whom, and for whom.

A. 1. Not that I know of.

X Q. 2. (To Gideon Bantz.) Do you know of anybody who is using such a furnace with reverberatory chambers? If so, who and where?

A. 2. I have heard of them, but don't know of them.

X. Q. 3. (To Gideon Bantz.) Did you not state, as a witness in your own behalf, in the case of yourself against Elsas & Pritz, in the district court for the southern district of Ohio, that you made your invention originally, in June of the year 1854, and that you applied for patent in March, 1855?

A. 3. This applies to Mr. Bantz, and I know nothing about it.

X Q. 4. (To Gideon Bantz.) Did you not, in that case, state that you made your first furnace in August, 1854, the next in 1859, and that the former of the two was being altered and changed by you more or less until perfected?

A. 4. To this I make the same reply. It applies to Mr. Bantz, and I know nothing about it.

X Q. 5. Have you never seen side or back door for taking out ashes in kitchen ranges, steam furnaces, or stoves, before you saw them in Bantz's wet-fuel furnace?

A. 5. In cook stoves I have, but not in furnaces.

X Q. 6. If the cima reversa, and the reverberating chambers, and the dead chambers are all left out, what do you then consider the characteristic difference between the Bantz furnace from the Thompson furnace?

A. 6. The difference between the Bantz furnace and Thompson furnace is, that in Mr. Thompson's the heat passed around through a narrow flue to get to the boiler, and in Mr. Bantz's it passed right under the boiler, direct from the furnace.

X Q. 7. If, under cross-interrogatory 6, you have shown the difference, in construction, between the Thompson and the partial Bantz patent,

explain what the difference, in effect, is; and what is, the cause of that difference?

A. 7. Mr. Thompson lost his heat in a long narrow flue, whilst Mr. Bantz's being direct through a fourteen-inch wall under the front of the boiler. Thompson had nothing under the boiler to make the heat strike the boiler and keep it there, whilst Mr. Bantz had reverberatory chambers, cima reversa bottom, and descending flue.

his
HENRY + WILSON.
mark.

Test:
HENRY WILLIAMS.

45 *Testimony of G. E. Bantz.*

Q. 1. State your name, age, residence, and occupation.

A. 1. G. Ernest Bantz is my name; my age, thirty-two years; my residence, Frederick, Maryland; and my occupation, a currier.

Q. 2. Are you related to Mr. Gideon Bantz; if so, how?

A. 2. I am. I am his son.

Q. 3. Do you remember when he began to use tan as fuel in his furnace?

A. 3. I remember when he first began to use wet tan, but not dry tan exclusively.

Q. 4. Did you ever know one Moses Thompson? If so, when and where did you first become acquainted with him, and under what circumstances?

A. 4. I did know Moses Thompson. I became acquainted with him in Frederick, when he came here to get information in reference to his furnace.

Q. 5. Did you ever know of Mr. Gideon Bantz making a model and drawings of a furnace for burning tan as fuel for Moses Thompson? If yes, state all you know about it.

A. 5. My father made his model and drawing. I saw him make them. The drawing herewith, marked Exhibit D, I saw him make.

Q. 6. Did you ever see a furnace built in accordance with Mr. Thompson's model and drawing? If yes, when and where?

A. 6. I did see one of Thompson's furnaces in March, 1854, at my father's tan yard.

Q. 7. Was this furnace operative and satisfactory? If yes, how long was it in use? If no, why not? Give the reasons fully.

A. 7. It was not successful, for the reason that we could not make sufficient steam to run the machinery one-fourth of the time.

Q. 8. Did you ever see a drawing of a furnace for burning tan as fuel having two or more fire-chambers, not arranged under the boiler, with a combustion chamber above the top of said fire-chambers, and located directly under the front end of the boiler? If so, when and where did you first see such drawing? State all you know about it, and how you fix your dates.

A. 8. I have seen such an one as is represented by my father's patent. I saw the drawing in June, 1854, at my father's yard. My father made the drawing; it was posted against the wall there for six or seven years. I fix the date by the fact that directly after that time my father purchased a boiler, the date of which is upon the receiving books of the railroad company.

Q. 9. Did you ever see a furnace built according to the said drawings? If yes, when and where? State all you know of it.

A. 9. I saw the one in use on my father's yard; it was up and ready for the boiler on the 6th of July, 1854.

Q. 10. How did said furnace operate, successfully or otherwise? If successfully, state the reasons, and your opportunities for knowing; and compare the success of said furnace with the success of the Thompson furnace, and state whether either was superior; and if so, why?

A. 10. It gave entire satisfaction; so much so, that it has been in use all the time since, and afforded sufficient steam for all our purposes without giving any trouble. My opportunities for knowing about the two furnaces were, that I was about the yard all the time, and I know, from practical observation, that Thompson's furnace failed to act, and that my father's gave entire satisfaction. The reason why Thompson's furnace did not act, it did not furnish sufficient heat, and what it did furnish was lost in the long, narrow flue, or mixing chamber, at the rear of the furnace. It was so hot at the rear that it fired the tan bank; we were compelled to dig it out and put clay in. In my father's furnace the heat from the furnace is applied immediately under the boiler.

46 Cross-interrogatories to G. E. BANTZ:

Answer each of the cross-interrogatories addressed to Gideon Bantz.

X Q. 1 (to Gideon Bantz). Was ever a furnace constructed entirely like your patent with cima reversa bottom, with reverberatory chambers, diving flue, &c., ever built? If so, state where, and by whom, and for whom.

A. 1. I never saw any other but those erected by my father.

X Q. 2 (to Gideon Bantz). Do you know of anybody who is using such a furnace, with reverberatory chambers? If so, who, and where.

A. 2. I know of none, except my father's, from my own knowledge; I have heard of others from other people.

X Q. 3 (to Gideon Bantz). Did you not state, as a witness in your own behalf, in the case of yourself against Elsas & Pritz, in the district court for the southern district of Ohio, that you made your invention, originally, in June of the year 1854, and that you applied for your patent in March, 1855?

A. 3. This is a question to my father.

X Q. 4 (to Gideon Bantz). Did you not in that case state that you made your first furnace in August, 1854, the next in 1859, and that the former of the two was being altered and changed by you, more or less, until perfected?

A. 4. In the Bantz furnace the fire-chamber, or chambers, are surrounded on top by dead chamber, or dead chambers, to insure safety from fire and comfort to the workmen. The fire-chamber, or chambers, are connected to the boiler or object to be heated direct, and when in operation are opened and remain so as long as you may want their heat; they are continuous in their operation (not intermittent, as in the Thompson); they are fired as often as they need replenishing; the products of combustion are consumed immediately under the boiler, or object to be heated; it is at this point the live heat is laid to be conducted off by the boiler, or object to be heated.

X Q. 5. Have you never seen side or back doors for taking out ashes in kitchen ranges, steam furnaces, or stoves, before you saw them in Bantz's wet-fuel furnace?

A. 5. I have seen them in stoves, but never in furnaces before my father's.

X Q. 6. If the cima reversa and the reverberating chambers, and the dead chambers, are all left out what do you then consider the charac-

teristic difference between the Bantz furnace from the Thompson furnace?

A. 6. The Thompson furnace consists of a series of burning chambers, each of which (i. e. the burning chambers) is provided with a short contracted flue containing a damper, and these short contracted flues are attached to a long narrow flue or mixing chamber; this apart from the boiler or thing to be heated. The Bantz furnace consists of a fire-chamber, or chambers, supplied with or without a dead chamber or chambers, and they, the fire chamber or chambers, are connected to the boiler or thing to be heated direct.

X Q. 7. If under cross-interrogatory 6 you have shown the difference in construction between the Thompson and the partial Bantz patent, explain what the difference in effect is, and what is the cause of that difference.

A. 7. In the Thompson the burning chambers are to be alternately charged, and their front and rear dampers closed at the same time, and opened at the same time; (they are not continuous in their operation); whatever is unconsumed in the burning chambers is to be consumed by the aid of the long narrow flue or mixing chamber on its way to and apart from the boiler or thing to be heated. It is at this point what little heat furnished by the burning chambers is conducted off to a serious extent by the surrounding brick work, earth and air before it reaches the boiler or thing to be heated.

G. ERNEST BANTZ.

Subscribed and sworn to before me this seventh day of April, A. D. 1877.

HENRY WILLIAMS,
Notary Public, Frederick, Maryland.

47 *Testimony of John Dewall.*

Q. 1. State your name, age, residence, and occupation.

A. 1. My name is John Dewall; I will be sixty-one years old next June; and my occupation a tanner.

Q. 2. How long have you been engaged by your present employer, and in your present employment?

A. 2. I have been tanning thirty-two years, and all that time with Mr. Bantz.

Q. 3. Did you ever know one Moses Thompson? If yes, when, and under what circumstances did you become acquainted, and how do you fix dates?

A. 3. I did know Moses Thompson; I knew him in the summer of 1853, when he came to see about burning wet tan. I fix my date by two things: first, Mr. Bantz's father died in 1854, and Mr. Bantz's son Marion, made a mark of the date, 1854, on the side of the boiler wall when it was put up, and I know that Mr. Thompson was here the summer before.

Q. 4. Do you know anything of Mr. Bantz's making him a model and drawing of a furnace for burning tan as fuel? If so, what do you know?

A. 4. I saw Mr. Bantz make a model and drawing both for him in the yard.

Q. 5. Did you ever see a furnace made according to that model and drawing; if so, when and where?

A. 5. I did see Thompson's furnace in March, 1854, built according to that model and drawing. I was the engineer and tried to run it.

Q. 6. How did that furnace operate? State all you know of it, and whether Mr. Thompson had anything to do with it.

A. 6. It did not operate at all; we worked at it day and night, sometimes all night, and Mr. Thompson himself was there sometimes as late as eleven or twelve o'clock at night. Mr. Thompson himself said it would not act; that he was sorry he had undertaken it. I told Mr. Bantz if he did not make some other arrangement I would quit, and he told me to hold on; that he would put one there that would act.

Q. 7. Did you ever know of any alteration being made in this furnace by Mr. Thompson, or any one else?

A. 7. He tried several times to alter the flues, etc., but it would not act; it would burn the tan-bank behind but would not go under the boiler. I advised several times to put the boiler over the long flue, and we would stand a better chance to make steam.

Q. 8. How long was it in use, and where?

A. 8. We used it about five months on Mr. Bantz's tan-yard.

Q. 9. Did you ever see a furnace for burning tan with two or more fire-chambers arranged under the boiler, with a combustion-chamber or reservoir above the top of said fire-chambers, and located directly under the front end of the boiler? If yes, where and when first, and how do you fix the date?

A. 9 I have seen Mr. Bantz's, which is arranged in that way. I fix my date in the same way that I did in reference to Mr. Thompson's furnace.

Q. 10. Did you ever see the original drawing of that furnace; if yes, where and when?

A. 10. I did; when we were building it in the engine-room.

Q. 11. How did that furnace work? and compare the success of the same with the success of the Thompson, stating which was superior, and why.

A. 11. It worked well, and there was as much difference as between day and night, in favor of the Bantz furnace, over the Thompson furnace, for the reason that the Bantz furnace got up steam and kept it up all day without stopping. We could grind more bark in one day with the Bantz furnace than we could in a month with the Thompson.

48 Cross-interrogatories to JOHN DEWALL:

Answer each of the cross-interrogatories addressed to Gideon Bantz.

X Q. 1. (To Gideon Bantz.) Was ever a furnace constructed entirely like your patent with cima reversa bottom, with reverberatory chambers, diving flue, etc., ever built? If so, state where and by whom and for whom.

A. 1. I never saw any except Mr. Bantz's, now in use on his tan-yard.

X Q. 2. Do you know of anybody who is using such a furnace with reverberatory chambers? If so, who and where?

A. 2. I don't know of any other except the one now in use on Mr. Bantz's tan-yard. I have heard of others, through Mr. Wisong, who saw them in his travels, infringing on Mr. Bantz's patent.

X Q. 3. Did you not state as a witness, in your own behalf, in the case of yourself against Elsas & Pritz, in the district court for the southern district of Ohio, that you made your invention originally in June, of the year 1854, and that you applied for your patent in March, 1855?

A. 3. This question applies to Mr. Bantz.

X Q. 4. Did you not in that case state that you made your first

furnace in August, 1854, the next in 1859, and that the former of the two was being altered and changed by you, more or less, until perfected?

A. 4. This also applies to Mr. Bantz.

X Q. 5. Have you never seen side or back door for taking out ashes in kitchen ranges, steam furnaces, or stoves, before you saw them in Bantz's wet-fuel furnance?

A. 5. I have seen them in cook stoves to be taken out in front or side, but never by the side of a boiler before Mr. Bantz's.

X Q. 6. If the cima reversa and the reverberating-chambers, and the dead-chambers are all left out, what do you then consider the characteristic difference between the Bantz furnace from the Thompson furnace?

A. 6. It would be pretty much like Thompson's, and would not act at all.

X Q. 7. If under cross-interrogatories you have shown the difference in construction between the Thompson and the partial Bantz patent, explain what the difference in effect is, and what is the cause of that difference?

A. 7. In Thompson's furnace the heat had to travel twenty feet through a narrow flue, and in that distance lost all of its life; in Mr. Bantz's patent the heat was applied directly in front of the boiler from the burning chambers.

JOHN DEWALL.

Certificate.

STATE OF MARYLAND,
FREDERICK COUN'Y, *to wit:*

I, Henry Williams, a notary public for the county of Frederick, State of Maryland, do hereby certify that the foregoing depositions were duly taken, sworn to, and subscribed before me, at the time and place mentioned.

Given under my hand and notarial seal this seventh day of April, A. D. 1877.

HENRY WILLIAMS,
Notary Public, Frederick, Maryland.

49 Circuit court of the United States for the district of Kentucky.

GIDEON BANTZ
vs.
DAVID FRANTZ ET AL.

The respondents will take notice that the complainant will examine witnesses in the above-named cause, under the 67th rule in equity as amended, before competent authority, examiner, at the office of Hatch & Parkinson, No. 8 West 3d street, Cincinnati, Ohio, on Monday, the 23d day of April, 1877, beginning said examination at 9 o'clock a. m. of said day, and continuing from day to day until completed.

HATCH & PARKINSON,
Sol's for Complainant.

Received copy April 10th, 1877.

LEWIS N. DEMBITZ,
Solicitor for Def'ts.

Here follows copy of depositions taken in pursuance of the foregoing notice.

Circuit court of the United States for the district of Kentucky. In equity.

GIDEON BANTZ
vs.
DAVID FRANTZ ET AL.

Examination of witnesses on behalf of the complainant, under the 67th rule in equity, as amended, in accordance with the annexed notice, before Ernest H. Rydal, notary public and acting special examiner, on Monday, the 23rd day of April, 1877.

Present: J. E. Hatch, esq., of Hatch & Parkinson, for complainant; L. N. Dembitz, esq., for respondents.

FRANK MILLWARD, a witness called on behalf of complainant, being first duly cautioned and sworn, deposes and says as follows in answer to interrogatories propounded to him by JOHN E. HATCH, Esq., of counsel for complainant:

Question 1. State your name, age, residence, and occupation, and whether or not you are the same Frank Millward heretofore examined in this case.

Answer 1. Frank Millward; age, forty-three; solicitor of patents and mechanical engineer; I reside at Ludlow, Kentucky; my office is in Cincinnati, Ohio; I am the same person that testified in this suit previously of that name.

Q. 2. Please look at Exhibit M T now shown you, being the file of the application of Moses Thompson for a furnace marked "Patented April 10th, 1855," state whether or not you have examined it, and understand the construction of the furnace shown in the drawings thereto attached?

A. 2. I have carefully read and examined the said exhibit, and believe I understand the construction and operation of the furnace therein shown and described.

Q. 3. Please state how a furnace constructed in accordance with the drawings of said patent would compare with or differ from one constructed in accordance with the reissued patent, No. 4731, granted Gideon Bantz, and give your reasons for any opinion you may express, referring especially to the features of the Bantz furnace, claimed in the first and third claims of the reissue?

A. 3. In my former testimony I have given the essential construction of the Bantz furnace, as described and shown in the Bantz patent, reissue 4731, in relation to the improvement specified in the first claim, and also with relation to that part of the improvement which is covered by the third claim. I have stated that the Bantz furnace consists, in so far as it relates to the first claim, of a steam boiler furnace, constructed specially for burning wet fuels, having two chambers—fire-chambers, located in the front of the boiler, and not under the same, these fire chambers communicating with the combustion-chamber located above the fire-chamber, and immediately under the front end of the boiler. The claim upon this part of the improvement reads as follows: "In a furnace for burning wet fuels, having two or more single fire-chambers not arranged under the boiler, the combustion-chamber or reservoir C, arranged above the top of said fire-chambers, and located directly under the front end of the boiler." In comparing this improvement with the furnace shown and described in Exhibit M T, I find as

follows: That the furnace described in said Exhibit M T is not a steam boiler furnace, but is a combination of three fire chambers for burning wet fuels, all communicating with a cross flue, which also communicates with a direct flue from said cross flue, the chambers each having a damper or valve operating to cut off communication from each chamber to said cross flue, or to open the same at will, so that the operator can smother two fires and keep the other burning brightly. It is said in the patent that a boiler may be attached to this furnace; and if it is so attached, the flue which extends from the cross flue must be made of a shape, size, etc., to properly enclose the boiler. There is no boiler shown in connection with the furnace and no construction indicated in any way by which a constructor could combine a boiler with such a furnace, in any particular way. The patent, however,
51 states that the boiler, when attached, is placed in connection with the flue marked I. It is not, therefore, intended to place the boiler over the cross flue marked F, and the cross flue marked F is covered by a crown or arch of brick-work, which would prevent it being used as a combustion-chamber under the front end of the boiler, in such a way that the gases in the combustion-chamber could act upon the boiler in the generation of steam. This Thompson furnace is, in construction and operation, entirely different from the construction and operation essential to the embodiment of the Bantz improvement, as expressed in the Bantz patent, reissue 4731, and summed up particularly in the first claim thereof, for the following reasons:

First, the Thompson furnace is nowhere shown and described to be in connection with a steam boiler at all, in such a way as to enable a constructor to build the same, as there is no drawing attached, and no specific description to guide a builder in combining a steam boiler with such a furnace.

Second, the Thompson furnace has no combustion-chamber or reservoir arranged above the top of its fire-chambers, and located directly under the front end of the boiler; and,

Third, it has no combustion-chamber corresponding with or adapted to perform the functions for which the Bantz combustion-chamber C is designed.

I have before stated fully, that it is necessary to the fulfillment of the Bantz improvement, that the two furnaces should unite in a combustion-chamber located under the front end of the steam boiler, and arranged to operate upon such steam boiler; there is no such construction shown or described in Exhibit M T. I before stated, also, that that portion of the Bantz improvement which is summed up in the third claim thereof, relates to the same construction of furnace, reservoir or combustion-chamber, arranged as I have described, with the addition thereof of the said door or doors for the admission of atmospheric air. It is sufficient to say, with reference to the Thompson furnace, that it has no combustion-chamber corresponding with the combustion chamber C of the Bantz patent in any respect with relation to the steam boiler, and, as this reservoir or chamber is the most essential requisite of that part of the improvement covered by the said third claim, it cannot be said with reason that the Thompson furnace embraces the improvement shown and described in the Bantz reissue, No. 4731, and specified in said third claim. I am clearly of the opinion that said Thompson furnace does not embrace said improvement.

Q. 4. What is the object of the combustion-chamber C in the Bantz patent?

A. 4. It performs two offices; one, a reservoir for receiving heated

gases for communication to the front end of the steam boiler, and the other, to unite and mingle the gases in a reverberatory manner which are received from the two fire-chambers.

Q. 5. What is the object of its particular location, and is there any especial importance attached to the particular point at which it is located?

A. 5. In burning wet fuels it is important that it should be located at the end of the furnace, so that the boiler may not have to extend over the top of the fuel chambers, and it is important that the boiler should extend over the combustion-chamber, so that the gases received into it may communicate their heat to the steam boiler directly.

Q. 6. At what part of the steam boiler should the greatest heat be applied?

A. 6. The most effective end of the steam boiler is that immediately in connection with the hottest part of the furnace, and in this case, this part is the combustion-chamber, so that it is important that the heat derived from this combustion-chamber should be utilized as speedily as possible upon the sheets of the boiler.

Q. 7. Considering the size of the flue F in the defendants' Exhibit M T, state whether, in your opinion, that would be sufficient to act as an effective combustion-chamber, even were a boiler placed over the flue I, and with its end projecting over the flue F?

52 A. 7. This flue F, in the Thompson patent, is simply a long cross flue. I do not see how a boiler could be placed over the flue I with its forward end covering the whole of the flue F, as the flue F extends too far on each side to permit any boiler having the requisite proportions in relation to the furnaces, to cover it. If a boiler the size necessary for such fire chambers, were located over flue I and extending over flue F, or rather over the middle of it, as it could not extend over it for its entire width, this flue F could not be regarded as a combustion chamber, within the meaning of the Bantz patent. It has no capacity for reverberation, and no capacity for the proper mingling of the gases received from the several fire-chambers, and it would have to be changed materially, in construction, to enable it to act at all upon a steam boiler, in the manner indicated in the question, as it would have to have its crown removed at that portion below the end of the boiler, and its crown retained at the sides where no boiler covered it.

Q. 8. Please state whether or not in your opinion with a furnace like the Thompson drawing and a boiler placed simply over the flue I without covering over the flue F sufficient heat could be applied to be effective, and give the reasons for your opinion.

A. 8. It would not. The heat is delivered from the furnace into the cross flue F, which would be exposed at the ends and other portions so that a great amount of heat would be lost by radiation and conduction before it reached the boiler at all, and the boiler would be too far removed from contact with the direct heat from the fires to be efficient as a steam generator.

Q. 9. Look at the drawing now shown you marked Respondent's Exhibit A, being the diagram referred to in the deposition of A. Frantz, junior, as a drawing of the furnace now used by the respondent, and state how the furnace, shown in said drawing, compares with, or differs from, both the furnace shown in the drawing of Exhibit M T, and from the furnace shown in the drawing of the Bantz reissue No. 4731, and state which of said last two drawings, the drawings of the Frantz furnace most nearly resembles, and give your reasons for your comparisons.

A. 9. The Frantz furnace, as shown by the Exhibit A, is substantially

the same in construction and mode of operation as the furnace shown in the Bantz reissue, with relation to the separate improvements claimed in said reissue, in the first and third claims thereof, and the furnace shown by this drawing, Exhibit A, is substantially different from the furnace shown in the Thompson drawing, Exhibit M T, for the following reasons: This drawing, Exhibit A, is a steam-boiler furnace, embracing two fire-chambers, adapted to burn wet fuel, both chambers communicating with a combustion chamber, common to both, which forms a reservoir for the reception of the gasses, and the proper mingling of the same by reverberation, this combustion chamber being above the fire-chambers and directly under the front end of the boiler, and this drawing, Exhibit A, shows also that the combustion chamber is provided with a side door, adapted to admit air for the regulation of the temperature and admission of oxygen to support combustion within the chamber; owing to the fact, therefore, that the furnace shown by this Exhibit A embraces this construction, I am of the opinion, clearly, that it embodies the separate improvements specified in the Bantz reissue, and set forth in the first and third claims thereof. It is not the same as the furnace shown in the Thompson patent, Exhibit M T, for the reason that it has this combustion chamber so arranged and operated, which the Thompson furnace has not.

Q. 10. I call your attention now to the second figure from the top of Exhibit A, longitudinally of the cross section of the Frantz furnace and boiler, and ask you particularly to note the door *s'*, and state supposing it to appear in evidence that the door *s* is to draw out ashes, etc., and noting the difference of the shading of the part about door *s'*, and noting also the top view of the furnace or the "plan of the lower floor," as it is called being the last view or figure upon Exhibit A, I ask you to state whether or not the Frantz furnace has the reverberatory chambers set out in the Bantz patent.

53 A. 10. The reverberatory chambers to which my attention is now called, as shown in the Bantz reissue, consist of pits or depressions in the brickwork under the boiler, into which the gases, as they are delivered from the combustion chamber, may pass and reverberate, and these chambers are provided with doors to admit air or permit cleaning. I find in drawing, Exhibit A, that although the section which appears second from the top in the drawing is badly colored, it represents two chambers, into which the gases, after they leave the combustion chamber, may pass and reverberate; one of these chambers being provided with a door marked *s'*. This door may be used to admit air for the purpose of governing the temperature under the boiler, and to permit the cleaning out of the reverberating chamber. These chambers in the Bantz reissue have no relation of course in construction or function with the improvement shown and described in said reissue, and referred to particularly in the first and third claims, for the reason that their operations or functions are performed whether there is a combustion chamber or not, or whether the steam-boiler furnace is one for burning wet fuel or otherwise, and the functions of the fuel chambers and combustion chamber and side doors opening into the combustion chamber are performed definitely and perfectly whether there are any reverberatory chambers beyond them under the boiler or not; but whatever the importance of the reverberatory chambers may be, as shown and described in the Bantz reissue, they are certainly embraced in the furnace shown in Exhibit A, and for the same apparent purpose.

Q. 11. Do you know whether or not reverberatory chambers under

steam boilers were old at the date of 1854, or whether they were new at that time?

A. 11. I knew of no boiler before I became acquainted with the Bantz steam-boiler furnace, which was so made as that its fire-chambers were in front of the boiler and discharged into a combustion chamber under the front end of the boiler; but I knew of boilers before 1854, and they are quite common now, in which the combustion chamber is the fire-chamber; it is located, of course, under the front end of the boiler. There are no combustion chambers other than those. And before 1854 I was aware that it was common to make the brickwork so that after the gases has passed over the bridge wall they would descend into pits or depressions for reverberation, and these pits or depressions were similar to the ones marked D in the Bantz reissue, and provided with doors opening into the same.

Q. 12. Do you know whether or not wet tan could be burned in a furnace of such construction?

A. 12. It could not, in my opinion, and I know of no attempt at burning wet tan in such a boiler furnace. The combination of the fuel chambers in front of the boiler, and not under it, and the combustion chamber uniting the fuel chambers, and immediately under the front end of the boiler, so that the gasses evolved from the furnaces may be combined, so as to act with great efficiency upon the boiler, is, it seems to me, the only practical solution to the question of burning wet fuels for the generation of steam in a steam boiler.

Q. 13. Do you know whether or not the Elsas & Pritz furnace used by the defendants in the case of Gideon Bantz vs. Elsas & Pritz, and for the use of which the defendants were enjoined, and in which case you testified a witness, had reverberatory chambers?

A. 13. It had not.

Q. 14. What is the use of the door s'', shown in the second figure of Exhibit A?

A. 14. Its important functions are, first, that it can admit air in any desired quantity for the regulation of the draft of the furnace and for the admission of oxygen to support combustion, and it serves the other purpose of enabling the attendant to inspect the condition of the furnace or combustion of gases at any time.

Q. 15. Can it be used effectively to rake out ashes from the combustion chamber?

A. 15. It could not, as it is evident by inspection of the drawings. It is located at the side of the furnace, opening into the combustion chamber, and above the combustion chamber is an inclined plane, descending into the fuel chamber. All the dirt which would collect upon the inclined plane would descend by gravity into the fuel chamber, or could be scraped into the same when the fuel chamber was cleaned. It is obvious that whatever dirt may collect in said combustion chamber could not be drawn out by scrapers or otherwise through the side doors practicably; the door is not for that purpose.

54 Q. 16. State what the object of the diving flue, described in the Bantz reissue, is; and what, if any, connection it has with the combination of devices claimed in the first claim.

A. 16. It is for the purpose, as stated in the patent, of causing the heat to hug the rear portion of the boiler, and to extinguish the sparks from the furnace. Its function would be performed just the same in any furnace under a steam boiler, whether it was a wet-fuel furnace, located in front of the boiler, and having a combustion chamber above the fuel furnace and under the boiler, or not. The function of this

diving flue is not one which co-operates in any way with the functions of the fuel chambers and combustion chambers, as the functions of the latter are performed completely, whether the diving flue is present or not; it is merely an additional feature at the end of the boiler, to perform a separate and distinct function, which has no relation to other functions performed by constructions appearing in other parts of the furnace.

Q. 17. What is the object of the dead chambers that are described in the Bantz reissue, and what, if any, connection they have with the features claimed in the first claim?

A. 17. They also have a distinct function to perform, which is in relation to the functions performed by the combination of the wet-fuel chambers and the combustion chamber in which they unite. These dead chambers are formed in the brick work of the fuel chambers, above the arches thereof, and filled with ashes, or other material, for the purpose of forming a partial non conductor, which will result in keeping the top of the fuel chambers, which is used as a platform for the men to stand upon, comparatively cool.

Q. 18. What is the object of the cima reversa bottom to the combustion chamber, described in the Bantz reissue? State whether or not it has any necessary connection with the combination of elements claimed in the first claim.

A. 18. It has no necessary connection whatever, as the functions of the fuel chambers and combustion chamber are performed whether the bottom of the combustion chamber is of the precise form designed by Bantz, or simply inclined, but he states that this formation by cima reversa curve is preferred, because it gives a free opening to the throat and causes the heated products of combustion to hug the bottom of the boiler. It is simply a preferred shape, and adapted to give a little better result than if not inclined. That is all.

Q 19. What difference would it make in the construction of a furnace, having the fire chambers and combustion chamber shown in the Bantz patent, if the dead chambers, the cima reversa bottom, the reverberatory chambers, and the diving flue were all omitted?

A. 19. It would make no difference substantially in the construction of the combination of fuel chambers and combustion chamber in connection with the steam boiler, and the operation of these parts, and the door leading into the combustion chamber would be the same, and the results identical, no matter whether the parts mentioned in the question were present or absent. This is obvious.

55 Cross-examination by L. N. DEMBITZ, Esq., counsel for the defendants:

X Q. 1. What do you mean by leaving out the reverberatory chambers; do you mean to take out the walls, or fill them up?

A. 1. Fill up the depressions between the walls, so as to make it like the drawing of the Elsas Pritz furnace, or of any other furnace without reverberating chambers.

X. Q. 2. If you did so, would the combustion chamber be materially deeper than it is in the Moses Thompson furnace?

A. 2. I understand that the Moses Thompson furnace has no combustion chamber at all, within the meaning of the Bantz reissue, or one capable of performing the functions of a combustion chamber, shown in the drawing Exhibit A, to which my attention is now directed.

X Q. 3. If those depressions were filled up, as stated before, would the combustion chamber be materially deeper than that part of the Moses Thompson furnace which is called the flue, the horizontal flue?

A. 3. I do not quite understand the question with reference to its allusion to the Thompson furnace, but, to make the matter plain, I will state, referring to the drawing Exhibit A, or to the drawing of the Bantz reissue, the depth of the combustion chamber need not be changed in the least, no matter whether the reverberatory chambers are present or absent.

X Q. 4. If those reverberatory chambers are filled up, how much height would remain for the combustion chambers of the Bantz furnace, as described in the drawing attached to the patent?

A. 4. I do not understand how the filling up of the reverberatory chambers could affect the height of the combustion chamber; therefore, I do not understand the question.

X Q. 5. Do you not consider the reverberatory chambers as part of the combustion chamber.

A. 5. No; they have no relation whatever to the combustion chamber; the combustion chamber is marked C in the patent, and the reverberatory chambers are marked D. They have no necessary connection and construction, or operation.

X Q. 6. How do you call the space above the walls which form the reverberatory chambers?

A. 6. The smoke throat.

X Q. 7. How high is the smoke throat in the Bantz patent?

A. 7. The drawing of the Bantz patent is not a scale drawing, as I understand the same; therefore, I cannot give any definite size to the smoke throat; but there is no reason why it should differ in depth from the smoke throats of ordinary furnaces under steam boilers.

X Q. 8. What is the height of such smoke throats?

A. 8. They are usually made deepest in the middle and shallowest at the sides; with a boiler forty inches in diameter and thirty feet long the smoke throat would not be deeper than from six to nine inches in the middle, and but three to four inches at the sides.

X Q. 9. Is not the smoke throat in effect a combustion chamber?

A. 9. It is not; but simply a flue.

X Q. 10. Does not the process of combustion go on in the smoke throat?

A. 10. No; if the gases leave the combustion chamber *c*, I don't think that any operation which can be called combrstion can be proceeded with, although the flame and products of combustion extend, of course, for some distance under the boiler.

X Q. 11. If you say that no further process of combustion can go on after the products leave the chamber *c*, what is the object of the doors in the reverberatory chambers, of which you say they are to admit oxygen?

A. 11. I have not referred to these doors in the reverberatory chambers as being designed to admit oxygen, but to the doors which leads into the combustion chamber. The doors in the reverberatory chambers need not be used at all for this purpose, although they could admit air for the regulation of the draft and reduction of temperature.

56 X Q. 12. Look at the flue F in the drawing attached to the Moses Thompson patent and state whether it has not, in fact, a combustion chamber.

A. 12. Not so far as it enables the hot gases from one furnace to another to ignite the cooler gases from another. It may act as such to a certain extent. It is not a combustion chamber within the meaning of the Bantz combustion chamber, as shown and described in the Bantz reissue. It is simply a long flue extending across the three fuel cham-

bers, in which the gases may unite to a certain extent, for the purpose of a proper ignition of those evolved from the furnace just fed.

X Q. 13. Why would not the flue F, in the Moses Thompson patent, work exactly like the combustion chamber in the Bantz patent?

A. 13. It has not the construction, form, and arrangement to enable it to perform that office.

X Q. 13. In what material respect does it differ from it?

A. 14. It is nothing more than a cross flue, as I said before, which unites the gases received from the three fire chambers, just as the street main receives water from different directions. It is not located with reference to forming a combustion chamber within the meaning of the Bantz improvement, and it is not capacious enough to permit reverberation and mixing of the gases and not adapted in its form and arrangement, to receive oxygen properly to support combustion. In my opinion, it is designed for a different purpose, as compared with the combustion chamber shown and described in the Bantz reissue.

X Q. 15. Can you state from an inspection of the drawing what the square contents of the cross section of the flue F would be?

A. 15. I presume the question refers to the superficial area in the flue in cross section, and I will say that the drawing is not drawn to a scale, but I should judge it would be probably one foot in superficial area in a full sized furnace.

X Q. 16. How much would the square contents of the cross section of the combustion chamber of the Bantz furnace be?

A. 16. The combustion chamber in the Bantz reissue is of peculiar formation, commencing with the throat leading out of the fuel chambers and greatly expanding or flaring, so as to form a capacious chamber in which the gases may reverberate, and exposure on the principal part, so that the heat may act directly upon the front end of the boiler. It requires some little measurement and calculation to determine what the superficial area would be, but without going over these figures, I should judge that it would be about two square feet in superficial area or more in a furnace with, say, a five foot length of grid bar.

X Q. 17. What is the area of the combustion chamber in defendants' furnace?

A. 17. About the same, I should judge, or a little less, owing to the inclined form of the bottom.

X Q. 18. What is the object of the narrow throat that leads into the combustion chamber in the Bantz patent?

A. 18. To concentrate and intensify the emissions from the fuel chambers.

X Q. 19. Do you consider this narrow throat material?

A. 19. The patent does not state that the throat should be of any particular size, but it should be of course of a size not too large for a proper inspection of the products of combustion into the combustion chamber, and not too small to permit the free exit of gases from the fuel chamber.

X Q. 20. Have you looked at any furnaces for the burning of wet fuels since you gave your former deposition in this case?

A. 20. I have not.

X Q. 21. Did you ever see a Thompson furnace at work?

A. 21. No, sir.

X Q. 22. Since you gave your last deposition in this case, have you studied any works on furnaces of this sort?

A. 22. On wet-fuel furnaces? No, I do not think these are any such works.

57 X. Q. 23. Are you still of the opinion expressed in your former deposition that the opening of the side doors would increase the blaze?

A. 23. The opening of the side doors sufficient to admit sufficient oxygen to support combustion properly would increase the blaze.

X Q. 24. Where there was no sufficient oxygen provided before, have you ever tried the effect of opening the side doors in wet-fuel furnaces when the furnace was heated?

A. 24. Yes, several times.

X Q. 25. In whose furnace?

A. 25. Elsas & Pritz's.

X Q. 26. What was the effect on the fire?

A. 26. With a partial opening the effect would be to intensify combustion and reduction of smoke; a wide opening would have the effect of reducing the temperature and an increase of smoke

X Q. 27. Whereon is your opinion based that a furnace constructed like that of Messrs. Thompson could not impart any sufficient heat to the boiler?

A. 27. From an observation of the construction of the furnace described in the patent alone.

X Q. 28. Have you ever seen any furnace analogous to it and watched its effect, and found from your own experience that the boiler would not be heated properly?

A. 28. No; I do not think that any constructor would combine a steam boiler with the flue I of the Thompson furnace, and expect to realize much in the way of the generation of steam therefrom. It would be almost like putting a steam boiler in a smoke-stack.

X Q. 29. What means of knowledge have you that it would not get heated, more than other persons?

A. 29. My knowledge is derived from experience in construction of steam boilers and uses of the same; and there are others, of course, who possess the same knowledge to the same extent, or more, who have been in the habit of constructing and using steam-boilers.

X Q. 30. Have you ever seen any steam-boiler at all analogous in its construction to the Messrs. Thompson furnace or boiler arrangement, whether heated by coal or by anything else?

A. 30. There is no definite arrangement shown for a steam-boiler in the Thompson patent at all, as I before explained, and I am unable to say what Thompson intended to do in the way of construction when he speaks of attaching a steam-boiler to the flue I. I am, therefore, unable to put a definite construction on an indefinite one alluded to in the Thompson patent.

X Q. 31. Is there anything in the papers of Thompson to prevent the steam-boiler, front of the steam-boiler, from being placed over the flue F?

A. 31. I presume there was nothing to prevent Thompson from constructing a steam-boiler and furnace in all respects like the Bantz, if he had conceived the invention and been competent to reduce it to practical form, but, after inspection of the Thompson drawing, it is evident that he has not done so. The arch of the flue F alone effects a complete enclosure of the flue on the top, and there is no provision for directing the gases from the flue to the end of the steam-boiler arranged over said flue F.

X Q. 32. Is this arch over flue F an obstacle to putting the boiler over it?

A. 32. Certainly it is an obstacle to the use of the flue as a means of heating the steam-boiler.

(Signature of witness waived in notary's certificate.)

58 STATE OF OHIO,
County of Hamilton, ss:

I certify that the foregoing deposition of Frank Milward was then and there reduced to writing by me, in presence of the deponent, in short-hand, by consent of parties to said cause, who were respectively represented by counsel at the taking of said deposition; that it was then and there agreed in my presence by said counsel that my transcript of said short-hand notes might be read in evidence on the trial of said cause with the same force and effect, to all intents and purposes, as if said transcript had been signed by said deponent at the time of the taking of said deposition.

I further certify that I am not a counsel or attorney for either of the parties to said cause, and that I am in no way interested in the event thereof.

In testimony whereof I have hereunto set my hand and notarial seal this second day of May, 1877.

E. H. RYDAL,
Notary Public, Hamilton Co., Ohio.

59 EXHIBIT A.—(*Referred to in deposition of Gideon Bantz.*)

(Correspondence of the Advocate.)

FREDERICK, *August 25th*, 1849

The tanneries here are very numerous and extensive, and this place might with great propriety be termed the "tanning depot" of the State, as I am informed that there is more leather furnished for the leather markets from this city than from all the other tanneries in the State combined. It can boast of nine; in three of them steam is employed as an agent in their operations. Mr. G. Bantz, sr., Mr. Loats, and Mr. Gideon Bantz, jr., are the most extensively engaged in this branch of manufacture. The establishment of the last mentioned individual (Mr. G. B., jr.) appears to be the best conducted, owing to his superior advantages of machinery and practical knowledge; his steam engine is one of twelve horse-power, and is used for various purposes, among others for grinding bark, rolling and splitting leather. His machinery is said to be the most complete and useful of any in the United States, and has been lately visited and examined by many able practical machinists, and the liberal proprietor has taxed his own time and patience to prepare drawings for them to aid in their examinations, thereby causing his improvements to be more widely known and used.

The greatest and most important discovery that has been made for many years in the work of tanning is that the refuse tan is much better (because more economical) than wood for generating steam; for by its use alone, $700 per annum is saved. His expenditure for bark alone for present year has amounted to $6,000, which is a heavy outlay for this article. Their leather, as soon as finished, is forwarded to the Baltimore market. They have orders always on hand to fill; they likewise enjoy a well-earned celebrity, as their motto is, "What is worth doing is worth doing well." I visited the several establishments with my friend Mr. J. C———, of Georgetown, who is soon to try his luck in retailing

the several articles connected with the trade. I wish him all success in his undertaking. * * *

EXHIBIT B.—(*Referred to in deposition of Gideon Bantz.*)

(Form A 150.)

FREDERICK, *July 8th*, 1854.

No.]

Mr. G. Bantz, to the Baltimore & Ohio Railroad Co., Dr.

	$ cts.
For transportation of merchandise from Baltimore, one boiler, (4,520 pounds)	6 78
Advances	

Received payment for the company.

F. HANSHEW, *for Agent.*

Car No.]

I certify that this a true copy from manifest.

60 DEPARTMENT OF THE INTERIOR, U. S. PATENT OFFICE.

To all persons to whom these presents shall come, greeting:

This is to certify that the annexed in a true copy, from the files of this office, of the file wrapper and contents and drawing, in the matter of letters patent granted Moses Thompson, dated April 10th, 1855, No. 12678, for improvement in furnaces for burning wet fuel.

In testimony whereof, I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this seventeenth day of November, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundred and first.

[SEAL.]

W. H. DOOLITTLE,
Acting Commissioner.

M. Thompson. Furnace. Patented Apr. 10, 1855.

No. 12678.

FIG. 1.

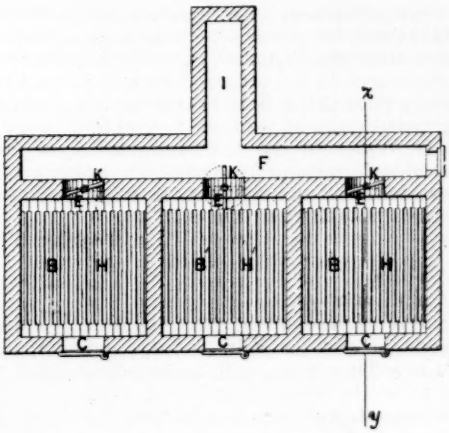
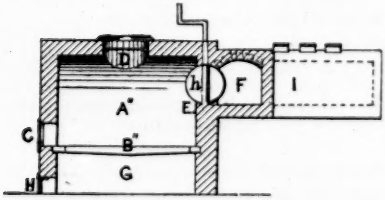


FIG. 2.



61 NEW YORK, *November* 12, 1853.

COMMISSIONER OF PATENTS:

SIR: We transmit, herewith, the specification and drawings of the following, viz: First. Improvement in rope machinery by Jôna Pearce. Second. Improvement in machine cutting flocks by Jos. W. Pitt. Third. Improvement in furnaces by Moses Thompson.

Enclosed are certificates of deposit for amount government fees, viz: Fifty dollars.

The two first cases are for caveats, and the latter one has been previously secured by caveat.

Respectfully, your obedient servants,

MUNN & CO.

Recorded and filed Nov. 12, 1853.—A. B. L.

Petition.

To the COMMISSIONER OF PATENTS:

The petition of Moses Thompson, of the county of Henrico, and State

of Virginia, respectfully represents that your petitioner has invented a new and useful improvement in furnaces for burning tan-bark, bagasse, saw-dust and other kinds of fuel for the purpose of creating heat, to generate steam, or to be employed in heating or drying operations, which he verily believes has not been known or used prior to the invention thereof by your petitioner. He therefore prays that letters patent of the United States may be granted to him therefor, vesting in him and his legal representatives the exclusive right to the same upon the terms and conditions expressed in the act of Congress in that case made and provided, he having paid thirty dollars into the Treasury and otherwise complied with requirements of said act. And he hereby authorizes O. D. Munn and S. H. Wales, of the firm Munn & Co., or their accredited agents, to act as his attorneys in presenting the application, and in making all such alterations and amendments as may be required; and also to receive the letters patent when issued.

MOSES THOMPSON.

STATE OF NEW YORK,
County of New York, ss:

On this ninth day of November, 1853, before the subscriber, a commissioner of deeds in and for said county, personally appeared the within-named Moses Thompson, and made solemn oath that he verily believes himself to be the original and first inventor of the within-described improvement in furnaces for burning tan-bark, bagasse, saw-dust and other kinds of fuel for the purpose of creating heat, to generate steam, or to be employed in heating or drying operations, and that he does not know or believe that the same was ever before known or used; and that he is a citizen of the United States.

L. PITKIN,
Com'r of Deeds.

62 The schedule referred to in these letters patent and making part of the same.

To all to whom it may concern:

Be it known that I, Moses Thompson, of the county of Henrico and State of Virginia, have invented a new and useful improvement in furnaces for burning tan-bark, bagasse, saw-dust, and other kinds of fuel in a wet state for the purpose of creating heat, to generate steam, or to be employed in other heating or drying operations. And I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Erased. See amendment of March 19th, '55. A. Insert A. Amendment filed March 19th, '55.

Figure 1 is a horizontal section of a furnace, constructed according to my invention.

Fig. 2 is a vertical section of the same, in the line *x y* of Fig. 1.

Similar letters of reference indicate corresponding parts in the several figs.

The main object of my invention is to effect the more economical use, for fuel, of tan-bark, bagasse, or other trashy matters in a wet
B state, or very green or wet wood. It is also applicable to the burning of fuel of that or other descriptions in a dry state, but when the fuel is dry it is much less useful, and I do not claim its application thereto.

The nature of my invention consists in the employment, in the manner hereinafter described, of a series of fire chambers, arranged side by

side, or in any convenient way to admit of the whole series communicating with the same heating flue, which said fire chambers are furnished with dampers by which their respective communications with the flue and the ash pan may be closed or opened at pleasure. This arrangement is for the purpose of enabling the process of heating the fuel to an intense degree in a nearly air-tight chamber, and then admitting a free supply of air to promote its rapid combustion, to be conducted without interruption to the operations which the heat, generated, is intended to effect.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The furnace, shown in the drawings, has three fire chambers, A A^1 A^2. Three is the number shown, as I consider that number, in most cases, to be best adapted for practical operation. The fire chambers are of square, but may be of other, form with grate bottom, B B^1 B^2 and arched tops; they are separated by walls of non-conducting material, and lined throughout with fire brick. Each is provided with a door, C, in front, for the purpose of lighting and tending the fire, with an opening at D, the top, for the purpose of supplying the fuel when it consists of tan-bark, saw-dust, or other material of a similar nature, and with an opening, E, at the back, which leads to the flue F, the opening E being provided with a damper, K. Each fire-chamber has a separate ash pit, G, below it, which is furnished with a door, H, to regulate the admission of air. The flue F extends across the back of all three fire chambers, and the chimney may be at one end, or may be placed in the rear, with a flue, I, leading to it from the flue F. If the furnace is used for generating steam, the best place for the boiler will be in the flue I, which will be made of proper size to receive and nearly surround it. If used for other purposes, any arrangement may be made that may be considered best, but the thing to be heated ought to be so high as not to require the products of combustion to descend on their passage to it.

Insert D. D. Amendment filed March 19th, '55.

63 The mode of conducting the operations of the furnace is as follows:

Fires being lighted in all the fire-chambers, two of the three have the doors H H of their ash pits closed, and the damper K K so nearly closed as only to allow a sufficient escape of the gases, generated by the slow combustion, which then goes on, to prevent explosion. The other fire chamber, in the mean time, has the damper K open, and the door of the ash-pit open far enough to admit any quantity of air that may be requisite to promote such a degree of combustion in the chamber as may be necessary to generate the amount of heat required The air should be may be forced in by a blower or drawn in, except when excluded by natural draft, and if a high stack be used, there should be a damper in it to check the draft. The flame or ignited gases from the open chamber will ignite the gases escaping from the nearly closed chambers, and further combustion will take place in the flue F. When the flue in the open chamber is reduced to a desirable degree, that chamber is closed and recharged, and another opened and supplied with air until the fuel within it is reduced, when it is closed, recharged, and another opened; each in its turn being opened and freely supplied with air, to generate and supply the requisite amount of heat, while the others are closed, and successively supplied with fresh wet fuel, to heat and decompose the fuel same to such a degree, as is desirable, before allowing rapid combustion and escape of the heat to take place. Each fire chamber

Insert E. Same amendment. Erased.

Insert F. Same amendment.

Insert G. Same amendment.

Insert H. Same amendment.

I am advised that the references given me by the office, on the rejection of my former claim, were insufficient, but on examination I find that my specifications do not set forth the gist of my invention so clearly as I supposed or desire. My invention does not consist in the improvement of furnaces simply, or in giving a combined action to several furnaces for burning common fuel, but in such a process or management, by the use of my several furnaces, as enables me to burn refuse tan, green cane, after the sugar is expressed, saw-dust, &c., all in a very wet state, in such a manner as to produce intense and continuous heat, far superior to what could be produced by dry fuel, and with a smaller consumption of fuel.

By my process the wet fuel I have mentioned is burned without a blast and with very little draft, and consequently with great economy. There is no smoke. The heat is intense, and is not driven by a blast into the stack, but absorbed for the purposes for which it is intended.

As I do not think my specifications sufficiently clear, I have to request that you amend them as follows:

Insert at A, page 1. On page 1, line 9, erase the words "furnaces for," and on line 11, insert between "fuel" and "for" the words "in a wet state."

Insert at B, page 2. On p. 2, at the end of 5, insert the words "or very green and wet wood;" at the end of first paragraph, after the word "state" insert "but when the fuel is dry it is much less useful, and I do not claim its application thereto."

Insert at C, page 2. At line 18, after the word "flue" insert "and the ash-pit."

Insert at D, page 4. On page 4, after the first paragraph insert the words "but the thing to be heated ought to be so high as not to require the products of combustion to descend on their passage to it."

66 From the beginning of last line but ten, same page, strike out, if you please, the first two sentences, and insert the following:

Insert at E, page 4. The air "should be drawn in (except when excluded) by natural draft, and if a high stack be used, there should be a damper in it to check the draft," and in the last line but one, after the words

Insert at F, page 4. "that chamber is closed," insert "and recharged."

Insert at G, page 5. Page 5, line 1, insert before "and," the word "re-charged."

Insert at H, page 5. Line 6, after the word "closed," please insert "and successively supplied with fresh wet fuel."

Insert as in pencil. Line 10, please substitute for the words "may" and "continuously," "should" and "successively," respectively. In the line succeeding, beginning with the word "through," inclusive, strike out all down to the word "at," line 15. Beginning with line 18, please strike out all to the first word ("added") of line 19, inclusive. Line 1, para-

Insert at I, page 5. graph 2, same page, after "furnace," insert "and process."

Please append, at the end of the specification, the following:

Insert at K, page 6. "A similar, but inferior result might be produced by having several separate grates and ash pits to the same fire-chamber, each grate charged successively, and its ash pit, for a time, closed immediately after fresh charging, to exclude the air. I have described this in my caveat upon which this application is based, but do not use it because of its inferiority in practice, although it involves my principle.

"After ample experiments I have discovered that any results which can be produced by the use of dry fuel, are entirely inferior to mine, in proportion to the quantity used, and that results like mine can only be attained by the use of wet fuel, similar to what I have herein mentioned,

fed into an intensely heated chamber. Under such circumstances the water in the fuel, in the presence of the carbonaceous substances, in the furnace, will be decomposed, giving its oxygen to the carbonaceous matter, dispensing with a draft and its cooling and wasteful influences, and rendering the combustion so perfect that no smoke is visible."

Amend, if you please, the claim as follows: Paragraph 2, line 3,
Insert at I, page 7. after the word "is" insert "the combustion, for the purposes of a high degree of heat, of bagasse, refuse tan, saw-dust, and other refuse substances, or very wet and green wood by."

In line 11 from the last, insert after the words "of air" the words
Insert at M, page 7. "when first charged." and at the end, append, if you
Insert at O, page 7. please, the words "no artificial blast being used."

MOSES THOMPSON.

To Hon. C. MASON,
Commissioner of Patents, Washington, D. C.

Amendment filed March 19, '55.—E. T.

Application of Moses Thompson.—Improvement in furnaces.

I cannot concur in the theory of the applicant in relation to the decomposition of water and some other matters, but regard his contrivance as a method of attaining an object effected in different ways by other persons.

It is well known that the smoke and gases evolved when wet or green fuel is added to any fire are, to a considerable extent, combustible. To effect this object, various contrivances have been suggested. We are now considering one of this character.

67 He claims, in pretty broad terms, "the combustion (for the purpose of a high degree of heat) of bagasse, refuse tan, saw-dust, and other refuse substances, or very wet and green wood," by the arrangement described in his specification. This consists in having three separate furnaces for the reception and combustion of the fuel above described. The flues from these furnaces are united at their rear extremity, so that when fresh fuel is added to one of the furnaces, the smoke and gases evolved uniting with the flame proceeding from the other furnaces, become completely consumed; and when fresh fuel is added to another furnace, that which was last replenished becomes sufficiently ignited to furnish the flame to consume the smoke and gases now being evolved, and so on, in continual rotation. Such an arrangement will doubtless be well adapted to the combustion of wet or green fuel. But is it new?

There seems to me but one of the references given in the office letters of rejection which seems to be a fair anticipation of any substantial part of the present contrivance or plan of operation. This is the patent of Bristow & Atwood, described in Newton's Journal, conjoined series, vol. 44, page 81. The same idea is clearly shown and reduced to practical operation in that case. The precise method of accomplishing this purpose is different in the two cases, but the same substantial end is aimed at in both cases. The gases evolved from the furnace into which fresh fuel is placed, are consumed by the flame from the other furnaces.

It is true Bristow & Atwood seem to have contemplated coal as the fuel to be used, but can a furnace previously in use for burning coal be patented for burning very wet or green wood, bagasse, &c.? I am not prepared to say that such cannot be the case, but am hardly able to say that it is patentable, without the aid of testimony different from any before me at present.

I am advised that the references given me by the office, on the rejection of my former claim, were insufficient, but on examination I find that my specifications do not set forth the gist of my invention so clearly as I supposed or desire. My invention does not consist in the improvement of furnaces simply, or in giving a combined action to several furnaces for burning common fuel, but in such a process or management, by the use of my several furnaces, as enables me to burn refuse tan, green cane, after the sugar is expressed, saw-dust, &c., all in a very wet state, in such a manner as to produce intense and continuous heat, far superior to what could be produced by dry fuel, and with a smaller consumption of fuel.

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fed into an intensely heated chamber. Under such circumstances the water in the fuel, in the presence of the carbonaceous substances, in the furnace, will be decomposed, giving its oxygen to the carbonaceous matter, dispensing with a draft and its cooling and wasteful influences, and rendering the combustion so perfect that no smoke is visible."

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In line 11 from the last, insert after the words "of air" the words Insert at M, page 7. "when first charged." and at the end, append, if you Insert at O, page 7. please, the words "no artificial blast being used."

MOSES THOMPSON.

To Hon. C. MASON,
Commissioner of Patents, Washington, D. C.

Amendment filed March 19, '55.—E. T.

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It is true Bristow & Atwood seem to have contemplated coal as the fuel to be used, but can a furnace previously in use for burning coal be patented for burning very wet or green wood, bagasse, &c.? I am not prepared to say that such cannot be the case, but am hardly able to say that it is patentable, without the aid of testimony different from any before me at present.

But, inasmuch as the applicant may, I think, be fairly considered as not claiming the broad principle of burning the smoke and gases generated in one furnace by bringing them in contact with the flames engendered in another, but limits himself to the employment of his series of fire-chambers to communicate with one flue, substantially as described, and inasmuch as his arrangement seems to me substantially different from that of either of the other patentees referred to, I am inclined to allow the patent, which is accordingly done.

C. MASON.

Decision of Com'r of Patents in favor of applicant. Filed March 26, '55. Recorded vol. 2, p. 483.

Moses Thompson, care of Hall, Rodd & Putnam, New Orleans, La. No. 12678.

68 COUNTY OF HENRICO, *State of Virginia:*

IMPROVEMENT IN FURNACES.

Received, Petition, Affidavit, Specification, 2 drawings, } November 14th, 1853.
3 model, December 29th, 1853.
1 cert. dep., $10, November 14th, 1853.
Caveat.
Cash, 20, August 12th, 1853.
2 examined, March 26th, 1855.
Issue. S. T. Sugert, March 26th, 1855. C. M.
3 patented, April 10th, 1855.
Recorded, volume 62, page 199.

Said patent to applicant, care of Hall, Rodd & Putnam.

W. P. N. FITZGERALD,
Washington, D. C.

Reported to examiner, March 2d, 1854.
Rejected, May 24th, 1854.
Papers and one drawing to me, March 15th, 1855.

MOSES THOMPSON.

Ex'd.—L. P. H.

March 20th, 1835, rejected the second time.

This package to be read at the hearing by defendants, subject to all proper exceptions.

L. N. DEMBITZ, *D. S.*

We agree to the above.

HATCH & PARKINSON.

Exhibit M. T.

69 Circuit court of the United States, district of Kentucky, at Covington.

At a term of our said court, held for its December term, A. D. 1877,

and on a day of said term continued and held, to wit, on Wednesday, December 5th, A. D. 1877, the following order was made, viz:

GIDEON BANTZ
vs.
D. FRANTZ ET AL.

This cause coming on to be heard, upon motion to transfer same to Louisville for argument, and it appearing to the court that the parties have agreed to the same, it is ordered that the transfer be made, and that the cause be heard at Louisville, on the 27th day of December, A. D. 1877.

At a term of our said court, held for its May term, A. D. 1878, and on a day of said term continued and held, to wit, on Monday, May 13th, A. D. 1878, the following decree was entered, viz:

GIDEON BANTZ
vs.
D. FRANTZ ET AL.

This cause came on to be heard at Louisville, on the 28th of December, 1877, in accordance with the order hereinbefore made;
70 and upon the hearing the plaintiff read the admissions made by the defendants in their answer, also read the exhibits made by and referred to in his bill, and the depositions of witnesses, namely, that of J. F. Twohig, Frank Millward, (two depositions and separate cross-examinations,) Gideon Bantz, G. E. Bantz, Henry Wilson, and John Dewall, and the exhibits proved therein and filed therewith.

The defendants offered to read Exhibit A A referred to in their answer, being certified copy of Moses Thompson's patent, and to prove it by the seal and attestation of the U. S. Patent Office. The plaintiff objected. His objection was overruled, and the proof made, and the exhibit was filed and read as proof, and pl't'ffs excepted.

The defendants also read the depositions of David Frantz, Frederick Kennell, and Lawrence Pratt, and the exhibits made by stipulation, namely, copy of specifications of plaintiff's original patent, and copy of Moses Thompson's file wrapper, and the defendants were allowed to file, and did file, an amendment to their answer, to conform it to the proof; and arguments of counsel being heard, the case was on the 29th of December, 1877, submitted, and the court not being fully advised, took time to consider.

And the court being now fully advised, it is ordered, adjudged, and decreed that the complainant's bill of complaint herein be, and the same is hereby, dismissed.

And it is further adjudged, ordered, and decreed, that the com-
71 plainant, Gideon Bantz, do pay to the defendants, David Frantz, sr., David Frantz, jr., and Geo. W. Frantz, their costs by them in the defence of this suit expended.

Complainant prayed an appeal to the Supreme Court of the United States, which is granted, upon complainant executing bond for costs in the sum of five hundred dollars.

Circuit court of the United States, district of Kentucky, at Covington.
In equity.

GIDEON BANTZ
vs.
D. FRANTZ ET AL.

I, Henry Bostwick, clerk of said court, hereby certify that the foregoing pages (this included), contain a true transcript of the proceedings had in the above-entitled cause, as the same are now of record and on file in my office.

In testimony whereof I have hereunto subscribed my name and affixed the seal of said court this 14th day of September, A. D. 1878, and of our Independence the 103d year.

[SEAL.]

H. BOSTWICK,
C. C. C. K. D.

72 Supreme Court of the United States.

GIDEON BANTZ
vs.
DAVID FRANTZ, DAVID FRANTZ, JR., AND George W. Frantz.

Know all men by these presents that we, Gideon Bantz, of Frederick City, Md., as principal, and Henry Kessler, of Cincinnati, Ohio, as surety, are held and firmly bound unto David Frantz, David Frantz, jr., and George W. Frantz, of Louisville, Ky., in the sum of five hundred dollars, lawful money of the United States, to be paid to the said David Frantz, David Frantz, jr., and George W. Frantz, their executors, administrators, or assigns, to which payment well and truly to be made we bind ourselves, and each of us, jointly and severally, and each of our successors, heirs, executors, and administrators, firmly by these presents. Sealed with our seals, dated this 2d day of July, one thousand eight hundred and seventy-eight.

Whereas the above-named Gideon Bantz has taken an appeal to the Supreme Court of the United States to reverse the decree rendered in the above-entitled action by the circuit court of the United States for the district of Kentucky: Now therefore

The condition of this obligation is such that if the above-named
73 Gideon Bantz shall prosecute his said appeal to effect, and answer all costs that may be adjudged against him, if he shall fail to make good his plea, then this obligation shall be void; otherwise to remain in full force and virtue.

H. KESSLER. [SEAL.]
GIDEON BANTZ. [SEAL.]

A true copy of the original now on file in my office.
Attest.

H. BOSTWICK,
C. C. C. K. D.

(Indorsement on cover:) No. 330. Gideon Bantz, appellant, vs. David Frantz et al. Kentucky C. C. U. S. Filed 9th November, 1878.

STIPULATION OF COUNSEL AND ADDITION TO RECORD.

a Supreme Court of the United States.

GIDEON BANTZ, APPELLANT,
vs.
DAVID FRANTZ ET AL. } No. 84. Oct. term, 1881.

It is hereby stipulated and agreed by the counsel hereto that the amended answers and specifications of the Moses Thompson patent, hereto attached (being pages one to fourteen, inclusive), are part of the record in this case, and may be added to said record by the clerk, and printed.

Cincinnati, Ohio, August 23, 1881.

ARTHUR STEM,
Counsel for Appellant.
LEWIS N. DEMBITZ,
Counsel for Appellees.

1 Proceedings of the circuit court of the United States for the district of Kentucky, at a regular term, begun and held at the Federal Court Hall, in the city of Covington, on Monday, May 13th, 1878, and of our Independence the 102d year.

Present, Hon. Bland Ballard, judge of the United States for the district of Kentucky.

GIDEON BANTZ
vs.
D. FRANTZ ET AL.

The respondents, by leave of court at the hearing, amend their answer to the bill of complaint as follows: By adding to the answer, after these words, "the reissue is unlawful and void," the following words: "The reissued patent is not for the same invention or inventions as the original patent."

L. N. DEMBITZ,
For Def'ts.

Here follows copy of Moses Thompson's patent, the same which is called Exhibit AA in the above order.

2, 3 The U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Moses Thompson, dated April 10th, 1855, No. 12678, for im'p't in furnaces for burning wet fuel.

In testimony whereof, I, W. H. Doolittle, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed, this sixteenth day of May, in the year of our Lord one thou-

sand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

[L. S.] W. H. DOOLITTLE,
Acting Commissioner.

4 The United States of America to all to whom these letters patent shall come:

Whereas Moses Thompson, of Henrico County, Va., has alleged that he has invented a new and useful improvement in furnaces for burning wet fuel, which he states has not been known or used before his application; has made oath that he is a citizen of the United States, that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said Moses Thompson, his heirs, administrators, or assigns, for the term of fourteen years from the tenth day of April, one thousand eight hundred and fifty-five, the full and exclusive right and liberty of making, constructing, using and vending to others to be used

5 the said improvement, a description whereof is given in the words of the said Thompson in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this tenth day of April, in the year of our Lord one thousand eight hundred and fifty-five, and of the Independence of the United States of America the seventy-ninth.

ROBERT McCLELLAND,
Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.

[L. S.] S. T. SHUGERT,
Act'g Commissioner of Patents.

The drawings referred to in this patent are found on page 57 of the printed record.

6, 7 Moses Thompson, of Henrico Co., Va. Letters patent No. 12678. Dated April 10th, 1855.

To all whom it may concern:

Be it known that I, Moses Thompson, of the county of Henrico and State of Virginia, have invented a new and useful improvement in burning tan-bark, bagasse, sawdust, and other kinds of fuel in a wet state for the purpose of creating heat to generate steam, or to be employed in other heating or drying operations; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Fig. 1 is a horizontal section of a furnace constructed according to my invention.

Fig. 2 is a vertical section of the same in the line *x y* of Fig. 1.
Similar letters of reference indicate corresponding parts in the several figs.

8 The main object of my invention is to effect the more economical use for fuel of tan-bark, bagasse, or other trashy matters in a wet state, or very green or wet wood. It is also applicable to the burning of fuel of that or other descriptions in a dry state. But when the fuel is dry it is much less useful, and I do not claim its application thereto.

The nature of my invention consists in the employment in the manner hereinafter described of a series of fire-chambers, arranged side by side, or in any convenient way to admit of the whole series communicating with the same heating-flue, which said fire-chambers are furnished with dampers by which their respective communications with the flue and the ash-pit may be closed or opened at pleasure. This arrangement is for the purpose of enabling the process of heating the fuel to an intense degree in a nearly air-tight chamber, and then admitting a free supply of air to promote its rapid combustion, to be conducted without interruption to the operations which the heat generated is intended to effect.

To enable others skilled in the art to make and use my inven-

9 tion, I will proceed to describe its construction and operation.

The furnace shown in the drawings has three fire-chambers, A, A,′ A″. Three is the number shown, as I consider that number in most cases to be best adapted for practical operation. The fire-chambers are of square but may be of other form, with grate-bottoms, B, B′, B″, and arched tops. They are separated by walls of non-conducting material, and lined throughout with fire-brick. Each is provided with a door, C, in front, for the purpose of lighting and tending the fire, with an opening, D, at the top, for the purpose of supplying the fuel when it consists of tan-bark, sawdust, or other material of a similar nature, and with an opening, E, at the back, which leads to the flue F; the opening E being provided with a damper, K. Each fire-chamber has a separate ash-pit, G, below it, which is furnished with a door, H, to regulate the admission of air. The flue F extends across the back of all three fire-chambers, and the chimney may be at one end, or may be placed in the rear, with

a flue, I, leading to it from the flue F. If the furnace is used for

10 generating steam the best place for the boiler will be in the flue I, which will be made of proper size to receive and nearly surround it. If used for other purposes, any arrangement may be made that may be considered best. But the thing to be heated ought to be so high as not to require the products of combustion to descend on their passage to it.

The mode of conducting the operations of the furnace is as follows: Fires being lighted in all the fire-chambers, two of the three have the doors H H of their ash-pits closed, and the damper K K so nearly closed as only to allow a sufficient escape of the gases generated by the slow combustion which then goes on to prevent explosion. The other fire-chamber in the mean time has the damper K open, and the door of the ash-pit opened far enough to admit any quantity of air that may be requisite to promote such a degree of combustion in the chamber as may be necessary to generate the amount of heat required. The air should be drawn in (except when excluded) by natural draft, and if a high stack be used there should be a damper in it to check the draft.

11 When the fuel in the open chamber is reduced to a desirable degree, that chamber is closed and recharged, and another opened and supplied with air until the fuel within it is reduced, when it is

closed, recharged, and another opened; each in its turn being opened and freely supplied with air to generate and supply the requisite amount of heat while the others are closed and successively supplied with fresh wet fuel, to heat and decompose the same to such a degree as is desirable before allowing rapid combustion and escape of the heat to take place. Each fire-chamber should be supplied successively with fuel at proper intervals by any convenient means, either through the hole D or through the door C, in front, just before closing the fire-chamber.

The principal advantage of a furnace and process of this description consists in heating and decomposing the fuel, without any further loss of heat than is absorbed by the poor conducting material of which the furnace is constructed, to such a degree as will, when a proper supply of air is admitted, cause the most perfect combustion of the gases and smoke to be effected. This could not be effected in a single fire-
12 chamber without interruption to the proper supply of heat, but where two or more fire-chambers are employed no interruption takes place, as one furnace is always in full operation. Another advantage consists in always holding a certain quantity of heat in reserve in the closed chambers, which may be immediately brought into action by opening one or more of the chambers. "A similar, but inferior, result might be produced by having several separate grates and ash-pits to the same fire-chamber, each grate charged successively, and its ash-pit for a time closed immediately after fresh charging, to exclude the air. I have described this in my caveat upon which this application is based, but do not use it because of its inferiority in practice, although it involves my principle."

"After ample experiments I have discovered that any results which can be produced by the use of dry fuel are entirely inferior to mine in proportion to the quantity used, and that results like mine can only be attained by the use of wet fuel, similar to what I have herein mentioned, fed into an intensely-heated chamber. Under such circumstances the water in the fuel, in the presence of the carbonaceous
13 substances in the furnace, will be decomposed, giving its oxygen to the carbonaceous matter, dispensing with a draft, and its cooling and wasteful influence, and rendering the combustion so perfect that no smoke is visible."

I do not claim the within-described arrangement of a series of fire-chambers to communicate with one common flue, irrespective of the purpose for which and the manner in which I employ the said arrangement.

But what I do claim as my invention, and desire to secure by letters patent, is "the combustion, for the purpose of a high degree of heat, of bagasse, refuse tan, sawdust, and other refuse" substances, or very wet and green wood, by the employment of a series of fire-chambers, arranged in any manner substantially as described, to communicate with one flue, when any number of the said chambers are nearly closed to the flue, and to the admission of air when first charged, as described, while the remaining chamber or chambers is in free communication with the flue, and has a free supply of air admitted, and each chamber in its turn is nearly closed, and then opened, and has air admitted, whereby the heat required is furnished by the combustion of the
14 fuel in one or more chambers, while the fuel in the other cham-

ber or chambers is being heated and decomposed to a desirable degree, as herein set forth, no artificial blast being used.

MOSES THOMPSON.

Witnesses:
O. D. MUNN,
JNO. W. HAMILTON.

15 Circuit court of the United States, district of Kentucky (at Covington).

GIDEON BANTZ
vs.
D. FRANTZ ET AL.

I, Henry Bostwick, clerk of said court, hereby certify that the foregoing fourteen (14) pages contain a true copy of the additional record in the above-entitled cause, as the same is now on file in my office.

In testimony whereof I have hereunto subscribed my name and affixed the seal of said court this 12th day of September, A. D. 1881, and of our Independence the 106th year.

[SEAL.]

H. BOSTWICK,
C. C. C. K. D.

(Indorsed:) Sup. Court U. S. 1881, October term. No. 84. Gideon Bantz, app'l'ts, vs. David Frantz et al. Stipulation of counsel & addition to record. Filed 15 Sept'r, 1881. Office Supreme Court U. S. Filed Sep. 15, 1881. James H. McKenney, clerk.

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Robert Clarke & Co., Printers, Cincinnati, O. [*October, 1881.*

IN THE

Supreme Court of the United States.

GIDEON BANTZ, appellant

vs.

DAVID FRANTZ et al.

IN EQUITY.

Appeal from Circuit Court of the United States, for the District of Kentucky.

APPELLANT'S BRIEF.

STEM & PECK,
Counsel for Appellant.

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Appeal from Circuit Court of the United States, for the District of Kentucky.

APPELLANT'S BRIEF.

This is an appeal by the complainant below from a decree of the Circuit Court dismissing the bill of complaint.

The suit was brought for infringement of re-issued letters patent No. 4,731, for Improvement in Boiler Furnaces for burning wet fuel, granted the complainant. It was heard by Hon. Bland Ballard, and a decree was entered in favor of the appellees (defendants below.) The Court below rendered no opinion, but simply ordered the bill dismissed (Rec. p. 65), from which decision the complainant appealed to this Court.

ERRORS ASSIGNED.

1. The Court erred in not finding the invention described in the original patent of complainant novel and useful.

2. It erred in not finding the re-issue of said letters patent to be for the same invention as the original, and therefore valid.

3. It erred in not finding that the defendants' furnace infringed the first, third and fourth claims of said re-issued letters patent sued on.

4. It erred in dismissing complainant's bill of complaint.

Letters patent of the United States were issued to Gideon Bantz, the appellant, for an Improvement in Boiler Furnaces, June 22, 1858 (Rec. p. 32), for a period of fourteen years. On February 6, 1872, said letters patent were re-issued, and on June 22, 1873, said re-issued letters patent were extended for seven years from said date.

It is on this extended re-issue that this suit is brought.

The defendants admit the grant, re-issue, and extension of the patent, but deny in their answer the novelty and utility of the invention, and the validity of the re-issue.

NOVELTY AND UTILITY.

In 1858, when complainant's patent was granted, all the machinery used in tanneries was run by steam engines using coal or wood, at great expense for fuel. Now they are almost universally run by engines using the refuse tan-bark for fuel.

The importance of this can be at once seen. The coal required to furnish power to run an ordinary tannery for a year, would be a very heavy bill of expense, and then, in addition to that, the immense mass of tan-bark that accumulated was a refuse that was required to be carted away at an additional expense. Now the expense of coal is saved; the expense of carrying away the refuse tan-bark is saved, and this refuse stuff, wet nearly as it comes from the vats, is placed in the furnace, and made to do the service of fuel. The man that first constructed a furnace that would utilize this refuse stuff, and save the expense of coal and cartage, undoubtedly conferred a great benefit upon the public, and made an invention of great value, that should have the protection intended to be afforded by our patent laws. We contend that Gideon Bantz, the complainant, is the inventor; that he is the first who successfully burned wet tan. It is true that numerous attempts

had been made before him to accomplish this desired result—that is, that numerous attempts had been made before he completed his present furnace. It is true, however, that no person began experiments upon this improvement earlier than the complainant. He is the pioneer that first broke ground in this department of the arts. As early as 1846, we find in the evidence that he was working toward this end. (Page 36, Ans. 3.) In 1848, he succeeded in using dry tan alone to run all his machinery. His operations were a complete success with dry tan, and he was experimenting with wet.

In August, 1849, a correspondent of the Baltimore *Advocate* writes from Frederick as follows. After describing Mr. Bantz's tannery, as well as a number of others, he says of it:

"The greatest and most important discovery that has been made for many years in the art of tanning, is, that the refuse tan is much better—because more economical—than wood for generating steam, for, by its use alone, $700 per annum is saved. His expenditure for bark alone, for the present year, has amounted to $6,000, which is a heavy outlay for this article," etc.

But where tan had to be dried before it was burned, large masses of it accumulated about the establishment, and it was requisite, or desirable, to have a furnace that would burn it in a damp state, as it comes from the vats, and to this Mr. Bantz devoted his labors, and as early as 1852 had devised his plan of burning tan in a furnace separate and apart from the boiler, and applying the heat from a (combustion) *chamber*, directly under the boiler, where the unconsumed particles of carbon, coming from one burning chamber, may have space enough to meet and mingle with the oxygen liberated from the moisture arising from the other burning chamber, or admitted through a slight opening of the door "*h*," and thus effect complete combustion, and at the point when its effect will be most powerfully felt, being immediately under the front end of the boiler.

Bantz completed his first furnace early in 1854, and

finding it a complete success, proceeded to take out his patent. He made the drawing and model himself, and knowing no person through whom to make his application, himself prepared his specification and claim. (Rec. p. 37.)

A full description of the invention is given in the original specification, and though the re-issue is much more complete and scientific, we shall refer entirely to the original.

DESCRIPTION FROM ORIGINAL PATENT.

The general nature of the invention is thus described by Mr. Bantz: "The object of this invention is the more perfect combustion of tan, sawdust, bagasse and all other kinds of refuse fuel in a wet or dry state, as well as of wood or coal. It is, however, of particular advantage to the burning of wet fuels."

He then refers to particular parts of the furnace as the arched fire-chambers, the combustion-chamber, reverberatory-chambers, etc., and proceeds to give a more detailed description of the parts, describing each, with its peculiar function separately, as follows:

"*A*, *A*, are two arched fire-chambers arranged side by side furnished with grates, *a*, *a*, and having ash-pits, *B*, *B*, provided below the said grates. These fire-chambers are not placed beneath the boiler, *H*, but directly in front thereof and longitudinally parallel therewith. They may, however, be placed at one side of the boiler, and at any angle to it. Each is provided with the usual door, *b*. But these are only used for lighting the fires; and the ash-pits are provided with doors, *c*, to regulate the supply of air through the grates and permit the clearing out of ashes. In the top of each chamber there are openings, *d*, *d*, for supplying the fuel. But as these feeders are the same as used in other furnaces no particular description of them is necessary. The fire-chambers are covered with a flat floor, built over the arches that the fuel may be wheeled to the feeders in barrows, or brought in any other convenient manner. At the rear end of each fire-chamber there is a throat-like aperture, *e*, communicating with what I call the reservoir,

C, which is built of brick and lined with fire-brick, under the front portion of the boiler."

He then proceeds to describe the bottom of this reservoir, its peculiar shape, so as to furnish easier angles for the heat as it comes from the fire-chambers. He adds: "The convex back of the reservoir terminates in and serves as a bridge-wall." . . The purpose of the reservoir will be presently explained.

He then proceeds to describe the reverberatory-chambers and the doors for the admission of air, as follows:

In the rear of the bridge-wall, *f*, there is a series of reverberatory-chambers, *D*, *D*, *D*, two, three, or more, one behind the other, the series extending nearly as far as the rear end of the boiler, and the said chambers being separated from each other by bridge-walls, *g*, *g*, and each chamber being provided with one or more doors, *h*, in either or both sides, *for the purpose of admitting air in small quantities to complete the combustion of the gases from the fire-chambers, or to check the draught.* The reservoir is furnished with a door, *h'*, for a similar purpose as those in the reverberatory-chambers." He adds that at the rear he has a dividing-flue through which the heated gases descend on their way to the chimney.

In describing the operation of the furnace, the inventor proceeds as follows:

"The gaseous products of the combustion in the fire-chambers, *A*, *A*, escape by the throats, *e e*, into the reservoir, *C*, *where they mingle together, and the combustible portion thereof becomes ignited, and where their heat acts upon the boiler, and from whence they pass into, one after another of the reverberatory-chambers, in each of which a portion of their heat is abstracted by contact with a portion of the boiler, and finally they descend the flue, E, to the chimney. The effect of* THE PRINCIPAL PORTION OF MY IMPROVEMENT, WHICH CONSISTS IN THE EMPLOYMENT OF THE RESERVOIR *C*, connected with the fire-chambers by the throats, *e*, *e*, of much smaller transverse area than the fire-chamber, is that the products of combustion and heat are prevented leaving the fire-chamber too rapidly, and the said chambers are consequently caused to be

heated to an intense degree, and a very nearly perfect combustion of the fuel is obtained therein; and when the gaseous products of combustion leave the fire-chambers by the said throats, and arrive at the reservoir, *C*, the side-walls and curved bottom and back of which are kept at a white heat, the still combustible portion of the gaseous products is ignited under the boiler."

He adds: "The doors *h*, *h*, in the reverberatory-chambers, besides being used to admit cool air in sufficient quantity to prevent draught and keep the fire damped, may be also employed to admit air in more limited quantities, to effect the combustion in the reverberatory-chambers of any inflammable gases that may pass the reservoir, *C*."

Having thus fully described his invention he proceeded, being ignorant of the strictness with which claims are construed, to aggregate together the principal parts of his furnace—the fire-chambers, the contracted throats, the combustion-chamber, the side-doors, the reverberatory-chamber and the diving-flue—making no discrimination between the important and the unimportant, the essential and the non-essential. But he nowhere in his claims says that they are all to be used together, and that none may be used separately. He nowhere calls them a combination.

ORIGINAL CLAIM.

The claim is as follows: "The arrangement of the fire-chambers, *A*, *A*, contracted throats, *e*, *e*, auxilliary combustion reservoir, *C*, provided with cima-reversa bridge-plate, *m*, *n*, and the door, *h'*, reverberatory-chambers, *D*, *D*, with doors, *h*, *h*, and the diving or direct flue, *E*, substantially as and for the purposes described."

We find here all the different features claimed together in a single claim, not in combination but in an aggregation. In the re-issue some of these features are claimed separately; it is therefore necessary no know whether any one of them was old.

The only evidence offered on this point was the introduction of the patent of Moses Thompson, and the testi-

mony of the use of a furnace by the predecessors of the defendant, in 1856.

THE THOMPSON PATENT.

The defendants pleaded, in their answer, this patent as an anticipation. It was not offered in evidence; but at the hearing the defendants were allowed to read it The complainant excepted (Rec., p. 65), and claims that not having been properly offered in evidence, it can only be read as evidence of the state of the art at the date of complainant's invention.

The date of the Thompson patent is April 10, 1855. The history of his invention, as shown by the record, is as follows:

While Mr. Bantz was experimenting on wet tan, Mr. Furneyhough, of Richmond, Va., having spent some time with him in obtaining information on tanning, introduced to him Moses Thompson, in the summer of 1853. It seems that Mr. Bantz's reputation as a tanner, from the success he had already achieved in burning tanbark for fuel, had spread to Richmond and other places, and thus brought to him Moses Thompson. Evidently Thompson came to learn what Bantz was doing, and there, from Mr. Bantz's experiment, first conceived his idea of a furnace. Bantz assisted him, as both were working together to the same end though through different methods. (Rec., pp. 36, 37.)

As a result of these experiments, Mr. Thompson devised his furnace as patented. Mr. Bantz made for him the drawings and model on which he that fall applied for his patent. (Rec., pp. 39, 41, Ans. 5.)

One of his first furnaces was erected at Mr. Bantz's tannery, and was a complete failure. (Rec., pp. 36–45.)

Mr. Bantz was perfectly familiar with Mr. Thompson's experiments, and his furnace and its failure; and, from this failure, was probably largely assisted in making his own discovery.

The invention of Mr. Bantz consisted, as shown by his patent:

1st. In constructing his furnace for burning wet fuel,

with two or more fire-chambers arranged in front of, not under, the boilers, communicating with a combustion-chamber or reservoir, arranged above (or higher than) the top of the fire-chambers, and located directly under the front end of the boiler. The greatest amount of heat where wet fuel is used, is not generated in the fire-chambers where the fuel is located, and to consume such wet fuel in any ordinary furnace would require so great a draught as would carry off through the chimney the products of combustion, in the shape of smoke, before their various gases could thoroughly mingle and perfect combustion be secured. To obviate the necessity of this great draught, and to secure the complete consumption of these gaseous products of combustion, Mr. Bantz provided a reservoir communicating with the fire-chambers into which these heated gases produced by the partial decomposition of the fuel, pass. In this chamber they become thoroughly commingled, and, if necessary, atmospheric air is admitted, so that complete and perfect combustion is attained, the fuel is burned more slowly without the necessity of so great a draught, and, by the perfect combustion, intense heat is produced.

It is important, therefore, that this chamber should be so related to the fire-chambers, and of such a size and shape, as to produce this intense heat, and should be located directly under the boiler.

The Thompson patent shows no such chamber. His invention consists of three or more fire-chambers for burning wet fuel, all connected with a single flue, each chamber having a damper or valve operating to cut off communication from the chamber with said flue, or open the same at will.

This flue was not intended, nor could it act, as a combustion-chamber. It is simply a flue connected with all the fire-chambers by valves, so that one fire can be kept brightly burning while the others are smothered, and thus avoid any interruption while the preliminary process of decomposition is taking place in one or more of the fire-chambers.

The inventor says: (See *Thompson Patent*)

"This arrangement is for the purpose of enabling the

process of heating the fuel to an intense degree in a nearly air-tight chamber (the fire-chamber) and then admitting a free supply of air to promote its rapid combustion, to be conducted without interruption to the operations, which the heat, generated, is intended to effect. * * *

The principal advantage of a furnace and process of this description consists in heating and decomposing the fuel without any further loss of heat than is absorbed by the poor conducting material of which the furnace is constructed, to such a degree as will, when a proper supply of air is admitted, cause the most perfect combustion of the gases and smoke to be effected (that is, in the fire-chambers.) This could not be effected in a single fire-chamber without interruption to the proper supply of heat, but when two or more fire-chambers are employed, no interruption takes place, as one furnace is always in full operation. Another advantage consists in always holding a certain quantity of heat in reserve in the closed chambers which may be immediately brought into action by opening one or more of the chambers."

The entire theory upon which Thompson proceeds is different from that of the complainant.

His combustion chamber and reservoir of heat is the fire-chamber itself, with its smouldering fire and sudden opening of the draughts. The cross-flue is simply a conductor of this heat to the object to receive it.

The only object of connecting it with all the fires is to keep the flow of heated air through it uninterrupted; the dampers serving to cut off and *hold in reserve* those which are smouldering.

Even if it were intended, this flue could not act as a combustion-chamber; it is too small and too narrow. (Rec., p. 48, Ans. 52.) Neither is it a boiler-furnace; but he says if a boiler is used, it should be placed in and embraced by the flue *I*; not the cross-flue, but a direct flue beyond and leading out of it. A flue removed by an intervening cross-flue from the fire-chambers; a "*flue*," as shown and described in the patent, entirely incapable for heating a

boiler; a flue where the heat would not and could not "hug" the surface of the boiler.

The Thompson furnace, therefore, lacks all the essential elements of this feature of the Bantz furnace.

First—Because it has no combustion-chamber or reservoir arranged above (higher than) the top of its fire-chamber, and located directly under the front end of the boiler.

Second—It has no combustion-chamber corresponding with or adapted to perform the functions for which the Bantz combustion-chamber "*C*" is designed.

Third—His furnace is nowhere shown or described in connection with a steam boiler in such a way as to enable a constructor to build the same so as to be operative.

(See expert deposition of Millward, Rec., pp. 46–53.)

The defendants have offered no evidence to meet this; it must, therefore, be conclusive.

Allen v. *Blount*, 3 Story, 747–749.
Alcott v. *Hawkins*, 2 Anier, L. J. N. S. 321.
Parker v. *Stiles*, 5 McLean, 64.

Another feature of the complainant's invention consists in combining with the combustion-chamber the small doors, *h'*, for the admission of atmospheric air.

Thompson had ascertained that for the complete combustion of wet fuels it was not only necessary that the fuel should be decomposed to such a state as to liberate the gases which composed it, but that after such decomposition had taken place, atmospheric air must be admitted to mingle with these gases, by which the process of combustion was completed. Without it, the gases would escape through the chimney in a partially consumed state, or as smoke. With it, the process of decomposition or combustion was completed, and a very much greater heat secured. This he proposed to do intermittently, and entirely in the fire-chambers.

He used three separate fire-chambers, no two of which were used together, but each in turn. Of the two not in active use, he says in his patent:

"The fires being built, the dampers were so nearly closed as only to allow a sufficient escape of the gases produced by the slow combustion, which then goes on, as to prevent explosion." After the fuel was partly decomposed, the dampers were then opened and the "fire-chamber freshly supplied with air, to generate and supply the requisite amount of heat."

There were two objections to this:

1. It required several furnaces or fires (not less than three) to make a constant supply of heat.

2. The intense heat was generated in the fire-chamber, where the atmospheric air was permitted to mingle with the products of the partial combustion, and had to be conducted thence by a flue to the chamber containing the boiler to be heated.

Both of these difficulties were overcome by Bantz. First, his combustion-chamber was arranged above and beyond, but in immediate and constant communication with the fire-chambers; by this means brought into immediate contact with the surface of the boiler to be heated, and so arranged that the heated products of combustion impinged against or hugged the bottom of the boiler, so that the sheets of the boiler received directly the intense heat generated in the combustion-chamber, which in Thompson's furnace is generated in the fire-chamber.

Second—He did not admit the atmospheric air necessary to complete combustion entirely through the fire-chambers, but directly into the combustion-chamber or reservoir, by the door, *h'*, in any desired quantity.

The Thompson furnace neither shows or hints at any such arrangement.

Still another feature of the Bantz invention which is infringed consists in arranging under the entire length of the boiler what he calls his reverberatory-chambers.

The products of combustion do not pass directly from the combustion-chamber or reservoir, *C*, into the chimney and become wasted, but into a series of chambers under the boiler, and are there further utilized. These gases are still very hot, and any portions not yet entirely consumed

are here completely decomposed by heat generated and applied to the surface of the boiler. In the Thompson furnace the products of combustion pass directly from the cross-flue to the chimney. What heat still remains in them is lost, and what particles of the fuel still unconsumed pass off in the shape of smoke. No resemblance whatever can be claimed in this respect between the Thompson and Bantz patents.

This Thompson patent was not properly offered in evidence as an anticipation (Rec., p. 65,) and can only be considered as affecting the state of the art prior to Bantz's invention.

The Patent Office files of the patent were offered in evidence, but these, too, can not be considered as an anticipation, but only as to the state of the art.

Corn-Planter Case, 23 Wal., 181.

The only other defense offered as to the novelty of complainant's invention is the fact that in October, 1856, the defendants erected a furnace under a license from Moses Thompson. A license from Moses Thompson could not authorize defendants to use Bantz's invention; but an attempt was made at the *hearing* below to show that this furnace of defendants contained some features of complainant's patent. The evidence simply shows that a furnace was erected by defendants in October, 1856; that it was *remodeled next* spring, and subsequently, when burnt out, it was taken out, and, as it never worked well, their present furnace was built, "thinking to improve on the matter, which they did."

(Rec., pp. 27–31.)

There is no description of the furnace built in 1856 whatever, except that it was like Thompson's patent—it was simply a furnace for burning wet fuel. It did not work, and was remodeled the next spring, and finally torn out. This is, no doubt, perfectly true. It is just what hundreds of others were doing at that time with the same experience; and until they adopted, at a later day, Mr. Bantz's invention, their furnaces were failures.

There is no evidence whatever to show that this furnace resembled the complainant's patent; but if it were exactly like it, it is no anticipation, as it was built two years after Mr. Bantz's furnace was complete.

(Rec., p. 36.)

The utility of the invention is clearly shown by the record. It saves all cost of coal or wood for fuel. By burning the refuse tan, it saves the necessity and cost of removing it; by burning it in a wet state, it produces much greater heat.

The second defense relied on by the defendants is contained in the allegation: That the re-issue is invalid, because it contains new matter not shown in the original.

The original specification showed and described clearly every feature shown and claimed in the re-issue. All these features may be used in a single furnace, or one or more of them may be used separately; all are not essential to the successful use of either.

In the original patent the complainant described each feature fully and distinctly; in his claim, he gathered them all together, as follows:

"The arrangement of fire-chambers *A*, *A*, contracted throats *e*, *e*, auxiliary combustion-reservoir *C*, provided with the cima reversa bridge-plate *m*, *n*, and the door h′, reverberatory-chambers *D*, *D*, with doors *h*, *h*, and the diving or direct flue *E*, substantially as and for the purposes set forth."

In the re-issue the features embraced in this claim are separated into five different claims, very much as though each feature had been numbered, thus: 1st, the arrangement of the fire-chambers *A*, *A*; 2d, the contracted throats *e*, *e*; 3d, the auxiliary combustion-reservoir *C*, etc.; and a sixth claim is added for the dead-chambers, which were fully shown in the original drawing, but not embraced in the claim.

as was done in the original patent in the specification (see Rec. p. 33)

It is contended by the defendants that the original claim was for a combination; that the re-issue separates the elements of this combination into different and inde-

pendent claims, thereby adding new matter and making the re-issue invalid.

There are some things in regard to the re-issuing of patents which ought to be considered as too well-settled to need discussion; and among these is the principle that the provision for re-issue is a remedial one, and is designed for the benefit of inventors, to secure to them the protection which the law affords for the inventions which they have made, in cases where, through imperfection, either in the description or in the specification of claim, the original patent fails to secure to them the full measure of protection to which they are entitled.

Another is, that "in whatever manner the mistake or inadvertence may have occurred, is immaterial. The action of the Government, renewing the patent, must be considered as closing this point, and as leaving open for inquiry before the court and jury the question of fraud only."

Stimpson v. *Westchester, R. R. Co.*, 4 Howard, 380–404.

Railroad v. *Stimpson*, 14 Pet., 458.

Seymour v. *Osborne*, 11 Wall., 543.

That "where the commissioner accepts the surrender of an original patent, his decision in the premises in a suit for infringement is final and conclusive, and is not re-examinable in such a suit in the Circuit Court, unless it is apparent upon the face of the patent that he has exceeded his authority, and that there is such a repugnancy between the old and the new patents that it must be held, as matter of legal construction, that the new patent is not for the same invention as that embraced in the original patent."

Seymour v. *Osborne*, 11 Wall., 543–4.

O'Reilly v. *Morse*, 15 How., 111.

"That power is unquestionably conferred upon the commissioner to allow the specifications to be amended, if the patent is inoperative or invalid, and in that event to issue the patent in proper form; and he may, doubtless, under that authority, allow the patentee to re-describe his invention, and include in the description and claims of the patent not only what was well-described before, but whatever

else was suggested, or substantially indicated, in the specifications or drawings which properly belonged to the invention, as actually made and perfected. Interpolations of new features, ingredients, or devices, which were neither described, suggested, or indicated in the original patent, or in patent office models, are not allowed."

Seymour v. *Osborne*, 11 Wall., 544.

The case principally relied upon by the defendants below was *Gill* v. *Wells*, in which the Court very justly condemned the abuse so often practiced in re-issues, of expanding the claims of a worthless patent, so as to cover subsequent inventions of other persons, neither shown nor suggested in the original patent, as they also did in the cases of *Burr* v. *Duryee*, *Carlton* v. *Bokee*, and others; but in this very case of *Gill* v. *Wells*, the Court said: "If, by inadvertence, accident, or mistake he (the patentee) should fail to claim any one of the described combinations, he may surrender the original patent and have a re-issue, not only for the combination or combinations claimed in the original, but *for any* which *were so omitted in the* CLAIMS of the original patent."

And in the case of *Bates* v. *Coe*, 15 O. G., 337, this Court has further interpreted this case of *Gill* v. *Wells* in accordance with this doctrine.

That a re-issue can not be held to be invalid merely because it claims devices, or combinations of devices, shown and substantially described, but not claimed in the original patent, is clearly taught by example rather than by the express enunciation of the doctrine, by an examination of a large majority of cases in this Court, and in the various Circuit Courts, in cases where re-issues have been sustained, and notably in the *Corn Planter case*, 23 Wall., 181.

This Court is bound to protect the public against the abuse of this privilege of re-issue, but it would be very unjust if patentees, who have honestly claimed in their re-issues inventions which were described or substantially indicated in their original patents, or have fairly re-described that which was imperfectly set forth in their original specifications, but clearly indicated and within the scope of their

original invention, and who have done so in reliance on these and other similar deliverances of this the highest judicial tribunal in the land, should find that they have been mistaken in their reading of the law, and discover too late that their patents are held to be worthless by the application of a less liberal construction of the law, such as is now argued upon this Court, and is sought to be applied to the re-issued patent of the appellant in this case.

The specification of the original, and of the re-issue are almost identical. But the claim of the original, as before stated, aggregates the parts; it does not combine them, whereas the re-issue separates those things that were before aggregated, and places in a separate claim each thing that has a separate function and a separate action.

The claim, as it stands in the original patent, could not be the subject of a valid combination, for the reason that it is not a combination, but simply an aggregation of parts, which is not patentable in itself under the law. *Hailes* v. *Van Worner*, 7 Blatch. 443.

The inventor describes the parts separately, as shown in the first part of this brief. He describes the reservoir or combustion-chamber, *C*, by itself, and calls it the principal part of his invention. He describes the reverberatory-chambers by themselves, and describes their function to receive the heat after it leaves the combustion-chamber, and retain it, and hold it under the boilers, a result different, and separate, and apart from any thing performed by the combustion-chamber. He describes the diving-flue again, separate and by itself, and so on through the several parts. It is true that he says they are intended for united use, and it is undoubtedly true that a furnace with all the parts would be better than one that only had some of them. But for that reason is an infringer to be entitled to take four of the most valuable features and use them without paying royalty, because the inventor in his original patent has said that his invention would be more complete if it had the fifth part with it? The re-issue simply does that which should have been done in the original, and which, but for the inadvertence of the inventor, would have been

done by any one who understood how a patent should be prepared; that is, the parts that act separately, and are described separately in the original patent, and that should have been separated in the claim, are claimed separately in the re-issue.

In this case the inventor applied for his patent himself, without the advice of a solicitor or attorney, and without any knowledge of the practice, and he says (Rec. p. 37, Ans. 10): "Through want of knowledge of the law, I put every thing in one claim, whereas the separate parts that act separately should have been claimed separately."

Upon a careful examination of the law of re-issue, as laid down by this Court, we conclude that an excellent, if not the best test of the admissibility of new claims in a re-issue is *whether or not the claims would have been good if found in the original patent.*

In *Union Paper Collar Company* v. *Van Deusen*, 10 Blatch. 112, Judge Blatchford says:

"Under the language of the specification of the original patent, the claim now found in the re-issue would have been a proper claim in the original patent; it is, therefore, a proper and valid claim in the re-issue.

Submitted to this test, it will hardly be contended that any one of our six claims would not have been a perfectly proper and valid claim in the original patent.

Not one of them, save the sixth, contains a feature or element not fully described and shown in the original patent and embraced in the collective claim, and the sixth is clearly shown in the drawing.

Judge Swing, in passing upon this patent (*Bantz* v. *Elsas*, 6 O. G. 117), says: "The presumptions of law are all in favor of its (the re-issue) validity. . . . But aside from this, by a comparison of the original with the re-issue, I do not find it extended beyond what I include in a fair and reasonable construction of the original. I do not think the original patent is for a combination; it is not, as described in the patent specifications or claims, and if it be not a combination, the patentee has a right to a re-issue for any of its valuable elements, separately or together.

"But, it is said, the re-issued patent embraces an element not within the original patent, to-wit: the dead-chambers. It is true that nowhere in the specifications of original patent are these dead-chambers spoken of, or their functions described, but they are clearly shown in the drawings accompanying the specification and the re-issue, nor does the inventor more than describe them and point out their functions. This is certainly not beyond what is shown in the original patent. Decree for complainant."

As we said in a former brief to this Court, it would seem that the difficulty and conflicting decisions as to what changes are admissible on re-issue have arisen, in a great measure, from a gradual change which has taken place in the meaning of the word "specification," as used in law. We presume that it will be admitted that no material change in the law of re-issue, from the original enactment in the 13th section of the Act of 1836, has been intended by Congress, but that the law is substantially the same under the 53d section of the Act of 1870, and section 4,916 of the Revised Statutes, as it was under the Act of 1836.

Now, in the Act of 1836, the word "specification" was, in some cases, synonymous with the word "claim;" but was never, we believe, employed to mean the description of the invention as distinguished from the claims.

In the Act of 1836, section 5, we read, "description, specifications and drawings." In section 7, "application, description and specification."

In section 6, "he shall deliver a written description, and shall specify and point out the part which he claims." Section 7, "shall alter his specification to embrace only that part which is new."

In the Act of 1837, section 2, we read, "specification and drawings;" and in section 7, "make his specification of claim too broad."

The 13th section of the Act of 1836, provided for re-issues, provides: "That whenever any patent which has heretofore been granted, or which shall hereafter be granted, shall be inoperative or invalid by reason of a defective or insufficient description or specification, or by reason of the

patentee claiming in his specification," etc.; and afterwards, in the same section, the terms "corrected description and specification" are used.

Obviously, the word "specification" here means claim; and we contend that it sometimes is employed to the description as well as the claim, and that there is nothing in the Acts now in force to exclude this interpretation.

See the recent decision of Judge Blatchford in *Wilson* v. *Crow*, 19 O. G. 482; and of Judge Lowell in *Smith* v. *Merriam*, 19 O. G. 621.

INFRINGEMENT.

It was tacitly admitted, at the hearing below, that the defendants' furnace infringes the first and third claims of the re-issue.

By reference to the drawings of defendants' furnace (Rec., p. 21,) and the one offered by defendants themselves, (Rec., p. 26,) it will be seen that it is a furnace constructed to burn wet fuel, having two fire-chambers, not arranged under the boiler, communicating by narrow throats with a combustion-chamber or reservoir, arranged above the top of said fire-chambers, and located directly under the front end of the boiler, as shown and described in the Bantz patent.

The reservoir, or combustion-chamber, is constructed in the same way, being large enough for the products of combustion to thoroughly mingle and be consumed; the top of its rear wall extends almost up to the boiler, thus preventing the too rapid passage of these products of combustion into the reverberatory-chambers, and causing them to impinge upon or hug the boiler.

The third claim is for the combustion-chamber located and arranged, as described, with the door *h'* for air. The defendants' drawing shows a door marked *s''*, opening into the combustion-chamber, exactly like that shown in complainant's. It is claimed by defendants that this door was principally used for removing ashes, etc.; the absurdity of this is apparent from the drawings.

The bottom of this chamber is at an angle of 45°,

while the bottom of the door, *s''*, is elevated above the bottom of the chamber and is horizontal, so that if the door was opened it would be almost impossible to clean out the combustion-chamber from it; besides this, the bottom of the chamber stands at such an angle that any ashes or soot, as soon as it began to collect in any quantity, would slide down into the fire-chambers.

The testimony of the expert in the case on this point was not rebutted or met in any way. He says of these two claims: (Rec., p. 23.)

"This part of the invention (referring to the first claim) is set forth as important, in the following language of the patent: 'The effect of the principal part of my invention, which consists in the location and arrangement of the reservoir, *C*, with respect to the boiler and fire-chamber, is that the products of combustion and heat are caused to leave the fire-chamber through the throat, *E E*, in immediate and direct contact with the boiler; and the said chamber and reservoir are constantly caused to be heated in an intense degree and to give out that intense heat upon the boiler without passing through an intermediate flue, while at the same time the boiler occupies no space within or above the fire-chambers.

"'A very important feature of this furnace is the location of the combustion-reservoir above the fire-chambers, as thereby the products of combustion are not forced out of a natural draught, but merely follow their natural tendency to rise in said reservoir.' I find that the furnace shown and described in the exhibit 'Frantz Furnace' and Mr. Twohig's deposition is one having two fire-chambers, constructed to burn wet fuel, the fire-chambers not being arranged under the boiler, and a combustion-chamber, or reservoir, which is arranged above the top of said fire-chambers, and located directly under the front end of said boiler, and substantially as shown and described in the Bantz re-issue patent, No. 4,731. The Frantz furnace has all the advantages and the same method of operation which is peculiar to the Bantz furnace, as contemplated in the Bantz patent. I am of the opinion, therefore, that the

Frantz furnace embraces the particular improvement specified in the first claim of the Bantz re-issue, No. 4,731.

And for the reason that the Frantz furnace has a door opening into the combustion reservoir, to which I have just referred, this door serving to admit any desired quantity of atmospheric air to this reservoir or chamber, as is required by the different circumstances, I am of the opinion that this furnace also embraces the particular improvement specified in the third claim of the Letters Patent, No. 4,731, which reads as follows:

"3. In combination with the combustion-chamber or reservoir, *C*, arranged and located as described, I claim the side-door or doors, *h*, for the admission of atmospheric air for the purpose described."

The cima-reversa bottom is not an element of either the first or third claims; it may be a better form of constructing the bottom, though an inclined bottom, such as used by the defendants, will answer every purpose and accomplish the same results.

Judge Swing, in his decision in the case of *Bantz* v. *Elsas*, above referred to, where the defendants' furnace was exactly like the one in this case, says (6 Official Gaz., p. 118):

"If the first and third claims of the complainant are to be confined strictly to a combustion-chamber or reservoir with a cima-reversa bottom and narrow throat, then the respondents do not infringe.

"I think, however, that the leading idea of the complainant is found in a combustion-chamber or reservoir, arranged in its relation with the fire-chamber and boiler for a particular purpose, rather than in the particular form of the back or throat of such chamber or reservoir. It may be true that he supposed the one described by him was best adapted for the purpose for which it was designed, but there can be no doubt that defendants' combustion-chamber occupies substantially the same relation to the fire-chambers and boiler that the complainant's does, and is for and accomplishes the same purpose in the same way. The only difference is in the shape or form of the bottom and size of the throat, and it is not claimed that there is any differ-

ence in the principle of the two. If this be so, shall the respondents, by a mere change of form, be permitted to use the complainant's invention? I think not."

The first and third claims are clearly proven to infringe.

The fourth claim is as follows:

"In combination with a series of fire-chambers, *A*, and the combustion-chamber or reservoir, *C*, located and arranged directly beneath the front end of the boiler, and above the crown of said fire-chamber, I claim a series of reverberatory-chambers, *D*, provided with side doors, *h*, and a diving-flue, *E*, at the rear end of the boiler to hold the heat beneath the same throughout its entire length, and to arrest and deaden the sparks as described."

As we have seen, defendants have the first elements of this combination, the fire-chambers, *A*; they have the second element, the combustion-chamber or reservoir, *C*, located and arranged directly beneath the front end of the boiler, and above the burning-chambers. We contend, also, that they have the third element—the reverberatory-chambers, *D*, provided with side doors, *h*, and diving-flue, *e*, at the rear end of the boiler, to hold the heat beneath the same throughout its entire length, and arrest and deaden the sparks. Their drawing shows, conclusively, that they have the reverberatory-chambers, as the door, *s*, opens into the first reverberatory-chambers, and the second reverberatory-chamber is towards the rear of the boiler, after the mud-drum. The reverberatory-chambers, the drawing shows, are provided with side doors: the only question that can arise, is, do the defendants have the diving-flue, *e*, or its equivalent, and is this made by the claim an essential concommitant to the reverberatory-chambers? The diving-flue, *e*, in the Bantz patent, is shown to be a piece of the wall of the furnace, built down at the end of the boiler, so that the heated gases, after having passed through the combustion-chamber and the reverberatory-chambers, instead of passing off directly into the chimney and escaping, will be retarded, and so affect the boiler with greater heat, by means of being compelled to descend the space, *e*, before reaching the chimneys. Now, we contend that the fact, that

the defendants, in their furnace, instead of allowing the heat to pass directly off at the end of the boiler, compel it to be returned, by the flue, through the boiler, and thus hold the heat through the entire length of the boiler, and arrest and deaden the sparks, renders their device the same, and the substantial equivalent of that described and claimed by complainant.

We also think, that, inasmuch, as defendants clearly have the fire-chambers, the combustion-chamber, the reverberatory-chambers, and side doors, they infringe the claim, because the third element is the substantial equivalent of the third element of complainant's claim, that is to say, the third element of the claim being for the reverberatory-chambers, *D*, with side doors, and a device for holding the heat through the length of the boiler, and arresting and deadening the sparks, and defendants having the same reverberatory-chambers and side doors and a device for retaining the heat through the length of the boiler, and arresting and deadening the sparks, they have the equivalent combination, even though one of the incidents of the third element of the claim is slightly different in manner of construction.

We think it is clear, therefore, that the defendants infringe three of the claims of the re-issued patent; that the re-issue was proper and valid; that the invention was novel and useful.

The court, therefore, erred in not ordering an injunction and decree for the complainant.

Respectfully Submitted,

STEM & PECK.